1. Introduction

A readiness review (RR) is a documented, independent examination of equipment, personnel, procedures, and management control systems to ensure that a facility, or portions of a facility, meets relevant Department of Energy (DOE), Los Alamos National Laboratory (LANL), and facility requirements before startup or restart. The guidance in this document supplements the requirements contained in LIR 300-00-08, "Startup/Restart of Laboratory Activities/Facilities" click here and is intended to assist organizations in conducting readiness reviews (RRs) of nuclear, radiological, and hazardous, non-nuclear operations at the Laboratory.

The requirements for performing RRs are specified in the following DOE and federal documents:

DOE Order 425.1B

AL SD 425.1B

DOE-STD-3006-2000

DOE-HDBK-3012-96

29 CFR 1910.119

These documents are very specific on the requirements for conducting an operational readiness review (ORR) for nuclear facilities, but provide limited guidance for the requirements and conduct of a readiness assessment (RA). The DOE Operations Office is required in DOE Order 425.1B to develop procedures for the RR processes. AL SD 425.1B meets this requirement. It expands the requirements for RAs to non-nuclear facilities, but leaves the responsibility for developing RA processes to the operating contractor. It also directs attention to 29 CFR 1910.119, Process Safety Management of Highly Hazardous Chemicals.

If a division or group has already implemented requirements that meet the intent of the requirements documents listed above and LIR 300-00-08, the requirements should be periodically revised to reflect changes to these requirements documents.

2. Purpose

This document provides a recommended process for implementing the provisions of the DOE order for the Start-up and Restart of Nuclear Facilities and activities at the Laboratory. This process, which applies the Laboratory Integrated Safety Management (ISM) principles (per LAUR-98-2837), should also be used for non-nuclear facilities.

The core functions of ISM are the following:

- (1) Define the work.
- (2) Identify and evaluate hazards.
- (3) Develop and implement controls.
- **(4) Confirm readiness** and perform the work safely.
- (5) Provide feedback and continuous improvement.

Readiness needs to be confirmed to perform the work safely. This LIG describes the application of a graded approach to confirm readiness before the startup/restart of facilities/activities is authorized.

3. Scope/Applicability

This LIG provides implementation guidance for the process of startup and restart at nuclear, radiological, and hazardous, non-nuclear facilities or operations at LANL. This LIG applies to all Laboratory organizations conducting nuclear, radiological, and hazardous, non-nuclear operations.

Organizations conducting operations considered to be standard industrial practices have been excluded from requirements to perform RRs by AL SD 425.1B.

4. Acronyms

The definitions for this process are the same as those provided LIR 300-00-08, "Startup/Restart of Laboratory Activities/Facilities" click here and are not repeated in this document.

Acronym	Definition
AA	authorization authority
CRAD	criteria and review approach document
DOE	Department of Energy
DOE/AL	DOE Albuquerque
HCP	hazard control plan
IP	implementation plan
MSA	management self-assessment
NEPA	National Environmental Policy Act
ODL	owning division leader
LASO	Los Alamos Site Operations
ORR	operational readiness review
POA	plan of action
PS	Performance Surety Division

Acronym	Definition
RA	readiness assessment
RR	readiness review
SAR	safety analysis report
SER	safety evaluation report
SNR	startup notification report
TSR	technical safety requirement
USQ	unreviewed safety question
USQD	unreviewed safety question determination

5. Precautions and Limitations

Some of the terminology used in the DOE requirements documents, such as "substantial modifications," requires both DOE and Laboratory work-responsible line managers to make decisions. The guidance contained in this document is intended to assist these managers in making the RR decision.

6. Guidance

The work-responsible line managers should determine early in the planning process that the planned activity is safe to perform in the designated area. Also, in this early planning phase, it is important to determine if a RR will be required to start the activity.

It is important to remember that the facility/activity should be in a state (i.e., ready) to commence operations so that the RR process can validate that all the necessary control measures are in place. "Ready" means that the work-responsible line manager has verified that the following:

- all necessary procedures are completed and approved,
- required personnel are available and qualified,
- safety basis documentation is approved, and
- necessary equipment is operational.

A RR process flow chart is contained in Attachment 4 of LIR 300-00-08, "Startup/Restart of Laboratory Activities/Facilities" click here. Recommendations for improvement of this process may be submitted on the Improvement Feedback Form (click here).

6.1 Readiness Review Entry Conditions

The basic entry conditions for this process include any of the following:

- the facility or activity is an initial start-up;

- the facility or activity has been formally shut down or shut down for an extended period and must restart;
- facility changes require a modification of the safety basis**;**
- substantial processes, system, or facility modification; or
- DOE has directed a RR for other reasons.

After the entry conditions are met, the work-responsible line manager should consider several other factors in deciding the type of RR required. Some of those factors are

- the category of the facility or activity as described in the Categorization LIR (LIR 300-00-05 *click here*);
- evaluation of some form of hazard analysis, hazard control plan (HCP) and/or an evaluation accomplished through the unreviewed safety question (USQ) process; and
- consideration of the impact on the safety basis and the extent and complexity of the changes after a facility/activity modification has been made.

Many changes/modifications are made to facilities/activities using routine work practices and facility procedures. These changes typically do not require a restart because (1) the facility/activity was not formally shut down;(2) the change is controlled through routine methods; and/or (3) the activity falls within the approved safety basis for the facility. Consequently, these changes are controlled through LIR 230-03-01, Facility Management Work Control. The USQD process may be used to determine if the change falls within the approved safety basis.

6.1.1 Construction Projects

Construction projects, defined in LIR 220-01-01, *click here*, include new construction, where the process starts with an idea and goes through the construction project management process to completion of facility upgrade or modification projects where the project is managed using the Construction Project Management principles. The decisions on what the required project acceptance and the readiness process to use should be made in the early planning phases.

If the project is new construction to build a operating facility or an activity within a facility, then a RR should be performed. There are many different ways that contracts are generated for these new facilities and, depending on the planning and management style chosen, the RR could occur before or after CD-4 (construction project critical point—Completion /Start of Operations). The contract approach should be clear in the initial planning. Again, as stated above, it is important to remember that the facility should be ready to operate before the RR begins.

If the project is to upgrade or modify an existing facility or activity, a RR may or may not be required. Table 1 and Table 2 of Attachment 1 to LIR 300-00-08 describe when a review is required. If the project is minor or a maintenance matter, and the facility is shut down to perform the work, then operations may resume by using standard operation and

maintenance procedures or management may chose to perform a management self-assessment (MSA) or a Laboratory readiness assessment (LRA).

If the project falls into one of the following categories, then it should be accepted following the Laboratory's construction project management process (LIR 220-01-01, Construction Project Management, *click here*), and completing the occupying or vacating work space process (LIR 230-01-03, Integrated Space Management Program, *click here*) as appropriate, without a RR:

- office only;
- receiving, shipping, and storage only (non-hazardous materials);
- recreational only;
- parking only;
- dining only; or
- other types of structures generally used for non-operational purposes.

6.1.2 Maintenance

Maintenance does not generally require a RR to resume operations. Maintenance is usually accomplished in accordance with Facility Management Work Control (LIR 230-03-01 *click here*) for facility work or approved requirements for programmatic work. The only time a RR is required is when directed by Laboratory or DOE safety- and environment-responsible line managers.

6.1.3 Decontamination and Decommissioning (D&D)

D&D work is considered an "operation." Before this type of work starts, the RR process should be considered. Attachment 1 of LIR 300-00-08 *click* should be used to determine the level of review, and D&D work should be included in the startup notification report (SNR).

6.1.4 Environmental Restoration (ER) Activities

ER activities are considered "operations." Before this type of work starts, the RR process should be considered. Attachment 1 of LIR300-00-08 *click* should be used to determine the level of review, and D&D work should be included in the SNR.

6.2 Types of Readiness Review

Readiness reviews can be as simple as a standalone MSA conducted by the safety- and environment-responsible line manager responsible for the work/activity to be performed or as complex and involved as a DOE operational readiness review (ORR). The graded approach should be applied to all levels of RRs and should be based on the following (also see DOE-STE-3006-2000, app. 1 *click*):

- relative importance to safety, safeguards, and security;

- magnitude of the hazard and risk involve;
- programmatic mission importance; and
- specific characteristics of the activity.

The method for determining the level of RR required for the startup/restart of a facility or activity is described in Table 1 and Table 2 of Attachment 1 in LIR 300-00-08, "Startup/Restart of Laboratory Facilities/Activities *click here*".

6.3 Startup Notification Report

DOE should be notified that a RR is anticipated well in advance, so that they may prepare. A minimum of 6 months advance notice for an ORR and 3 months advance notice for an RA are recommended. This Start-up Notification Report is required by DOE Order 425.1B and described in the DOE-STD-3006-2000. The Start-up Notification Report is part of the process that should be implemented to determine the level of the review to be conducted and to identify the authorization authority (AA) (LIR 300-00-08). It should be submitted as described in LIR 300-00-08, "Startup/Restart of Laboratory Facilities/Activities*" click here*. The division RR coordinator should prepare and submit the SNR to the Performance Surety (PS) Readiness Review Coordinator. The PS RR coordinator reviews the SNR and forwards it to the LASO RR coordinator for approval.

6.4 Management Self-Assessment (MSA)

ORRs and RAs are processes to independently confirm readiness of new or modified facilities and activities. To confirm readiness, the facility/activity must be ready. The work-responsible line manager should determine that the facility/activity is ready before proceeding with the ORR/RA (LIR 300-00-08). In this document, the process for determining readiness is called a Management Self-Assessment (MSA). When a RR is not formally required, a MSA may be a standalone review.

The owning division leader (ODL) should have a process to verify that the equipment involved is operational, the applicable procedures are completed and usable, and that the people are adequately trained and demonstrate the necessary proficiency to conduct operations (LIR 300-00-08). This process may take the form of a readiness verification plan or implementation of a self-assessment process. In either case, it should establish the criteria for determining readiness, cover the scope for the ORR/RA, should be completed with a documented report, and provide for documenting and correcting deficiencies.

A RA or ORR should not be requested until the work-responsible line managers have completed a Management Self-Assessment (MSA), as described in LIR300-00-08 and this document. ORRs and RAs should not to be used as tools for operating managers to achieve operational readiness.

The project design and construction, performance tests to demonstrate operational readiness, and required documentation should be completed and ready for review. Activities that cannot be tested prior to authorization to proceed should be documented, and a start-up plan to conduct these operations should be available for review by the RR team. All required environment, safety, and health (ES&H) controls identified in the hazard documentation should be in place.

The MSA process can take the form of a readiness verification plan or implementation of a self-assessment process. In any case, the MSA process should

- be thorough enough to evaluate all aspects of the facility and process,
- establish the criteria for determination of readiness,
- cover the scope of the ORR/RA,
- be completed with a documented report, and
- provide for documentation and correction of deficiencies.

If only a standalone MSA is required, the MSA report should be addressed to the work-responsible line manager who is responsible for the startup/restart.

The MSA process is not required to be conducted independently of safey-responsible management. It can be conducted over the entire process of getting operations ready and can be repeated, as required, to obtain the desired results. The process should be performance based and should involve all of the operations and support personnel who will be involved with the operation. The work-responsible line manager should be involved with the assessment and make the final readiness decision.

After a MSA has been completed and deficiencies resolved, a Readiness-to-Proceed Memorandum (see section 6.10 below and Attachment 5 of LIR300-00-08 *click*) should be submitted to the designated authorization authority.

It is possible to proceed with the ORR/RA with pre-start findings from the MSA, but these findings should not be of a nature to prevent the ORR/RA team from being able to observe operations and conduct the required confirmation described in the plan of action (POA) and implementation plan (IP).

Additional guidance on MSAs associated with the RR process is in Attachment 6. Also included is a sample checklist and report format for an MSA associated with the RR process.

6.5 Readiness Assessments (RA) and Operational Readiness Reviews (ORR)

When conducting a RA/ORR, team members should use DOE-STD-3006-2000 *click* as guidance for developing all of the required documentation. The following elements should be completed whenever an LRA/LORR is conducted:

- Prepare a Startup Notification Report

- Achieve functional readiness
- Complete a Startup/Restart Plan
- Conduct a management self-assessment
- Prepare a POA
- Prepare an IP
- Execute the onsite review
- Prepare the final report
- Respond to findings
- Prepare a DOE readiness-to-proceed memorandum

These elements are identified and their relationships are shown in the flowchart in Attachment 4 of LIR 300-00-08 *click.*

6.5.1 Plan of Action

A POA establishes the breadth of the review by defining the technical and geographic scope of the ORR or RA. The POA also identifies the AA and the functional areas to be reviewed; assigns the team leader responsible for conducting the review, identifies the prerequisites and decision points in the assessment process, and includes a milestone and start-up schedule of the activity. (See DOE-STD-3006-2000, Paragraph 5.9.1 *click here*) The POA should be developed as early in the process as possible.

Senior members of readiness review teams (team leaders and senior advisors) should not be individuals selected from offices assigned direct work-responsible line management responsibility for the work being reviewed. These personnel should be from a division other than from the owner of the process to be reviewed. Exceptions should be granted only by the owning division leader (ODL). The Performance Surety Division (PS) Readiness Coordinator is available to assist the ODL if there is difficulty finding a team leader who is independent of the process under review.

The content of the POA for a Level 3, 4 or 5 RA is only that required by DOE Order 425.1B, paragraph 4.c. (1). When the specified content, review chain, and approval level are included in another plan, such as a start-up plan, the other plan may serve as the ORR/RA POA for the particular new start or restart. Refer to Attachment 2 for information on drafting a POA and samples.

The ORR POA should be prepared by the division level line organization responsible for the activity or facility and forwarded for approval through the ODL to the DOE AA. The RA POA should be prepared by the group leader (or equivalent) of the work-responsible line organization requesting the RA and forwarded through the ODL to the AA for approval. The DOE may decide to approve POAs where the Laboratory is the AA and will make this annotation in an endorsement to the SNR.

POAs are based on the DOE core requirements specified in DOE Order 425.1B and DOE-STD-3006-2000 and listed in Attachment 3 of LIR300-00-08 *click here*. To

achieve the required breadth, each of the minimum core requirements should be addressed when developing an ORR. Justification should be provided in the POA if it is determined that a particular core requirement will not be reviewed as part of an ORR. To justify not performing further evaluation of a core requirement during an ORR, the POA may reference a timely, independent review that addressed the requirements in a technically sound manner. A set of the core requirements should be selected when developing the breadth of a RA. For Laboratory RAs, the selection of the applicable core requirements is based on a graded approach. For example, a routing resumption of operations after a short outage in which a few minor repairs and/or modifications are conducted may require only a pre-approved checklist with no core requirements. The method for selection these core requirements is described in LIR 300-00-08, "*Startup/Restart of Laboratory Facilities/Activities"* *click here* Section 6.2 and Tables 1 and 2 of Attachment 1.

The core requirements are directly related to the seven guiding principles of ISM because the core requirements are used to assess the readiness of facility personnel, procedures, programs, and equipment to conduct work safely.

6.5.2 Assembling a Review Team

The ODL, in consultation with the facility readiness review coordinator and the work-responsible line manager, designates a review team leader to assemble the Laboratory RA/ORR readiness review team. The review team leader, in consultation with the facility readiness review coordinator, selects the review team members (see LIR 300-00-08).

6.5.2.1 Review Team Leader Qualifications

The review team leader should have the following qualifications:

- technical familiarity and understanding of the facility/activity being reviewed;
- previous readiness/performance-based review experience or formal readiness review training;
- independence from the facility/activity being reviewed (i.e., may not review their own work, their supervisor's work, or work for which they were the responsible manager); and
- demonstrated leadership and managerial skills.

6.5.2.2 Review Team Member Qualifications

Review team members should have qualifications in the following areas:
- technical knowledge of the facility/activity being reviewed; (This knowledge should include actual working experience in a discipline related to the review subject.)
- knowledge of performance-based assessment processes and methods; and (This knowledge may be gained through experience as an auditor/ inspector, previous readiness/performance-based review experience, or formal readiness review training.)

• facility-specific information that may be gained through a combination of required reading, facility tours, and/or presentations.

Review team members should have expertise in the functional area assigned to them to review. Typical functional areas include the following:

- conduct of operations
- training and qualifications
- safety basis
- operability of safety systems
- maintenance
- waste management
- environmental protection
- industrial safety
- industrial hygiene
- radiological protection
- emergency management
- directive compliance
- engineering
- criticality safety

Review team members should be independent of the activity being assessed. For LRAs, review team members should be selected from groups other than the using group. If necessary, they may reside within the using group if they possess certain subject matter expertise that is not available elsewhere. Review team members who work for the using group are not allowed to review their own work or the work of their supervisor, but may prove most useful to the review team as a technical advisor.

LORRs should be performed by review team members from outside the owning division. If, however, it proves imperative to enlist review team members from the owning division or the using group, a request should be sent to the DOE for approval.

Final composition of the readiness review team may change after the IP is developed and if additional experience and expertise are needed. Once the team has been selected, the ODL should formally approve the review team leader and members.

It is advantageous to keep teams small. Smaller teams typically result in fewer logistical problems and simplify compiling the final report. However, a smaller team requires more from each review team member, both in experience and time dedicated to the readiness review.

In no case is it appropriate to have a DOE representative on the LRA/LORR team. However, the DOE may conduct either routine or formal oversight if deemed necessary.

6.5.3 Implementation Plans (IP) and/or Readiness Checklists

The team leader assigned to an ORR or RA is responsible for developing and approving an IP that establishes depth of the review by establishing specific performance objectives, acceptance criteria, and review approaches that are bounded by the scope of the POA (LIR 300-00-08). The depth of the readiness review should be defined by applying a graded approach to core requirements. The IP should also identify team members and assign responsibilities for functional areas, identify facility specific training requirements,

and describe procedure/protocols governing the review. (See DOE-STD-3006-2000, Paragraph 5.9.2 *click here*) Attachment 3 provides information and format for drafting an IP.

Members of readiness review teams should not review their own work or work for which they are directly responsible. The PS Readiness Coordinator is available to assist the ODL if there is difficulty finding team members who are independent of the process under review.

The team leader should review and approve all team member selections for RRs based on documented qualifications and expertise. DOE-STD-3006-2000, Appendix 4 *click here*, contains guidance on the type of team training required and samples of how it is recorded.

A readiness checklist may be used in lieu of an IP for a Level 3, 4, or 5 RA. If a readiness checklist is used, the checklist items to be verified by the team may be included in an attachment to the POA or generated through the work-responsible line managers.

Like the POA, the IP/readiness checklist should be developed as early in the process as possible. The team leader should provide the IP to the AA and LASO for distribution and comment.

6.5.4 Criteria and Review Approach Documents

The performance objectives and acceptance criteria developed for the IP by the review team leader and members are based on the Criteria and Review Approach Documents (CRADs). The CRADs are the means through which the graded approach is applied to the scope of the RR.

Each review team member should write the CRADs and/or checklists for their assigned functional area. Each CRAD should be as specific and as objective as possible and thoroughly assess those functional areas that are significant to the startup/restart. For details on developing CRADs, refer to the Writing Guide in Appendix 4 of DOE-STD-3006-2000, Planning and Conduct of Operational Readiness Reviews

The review team leader reviews and approves the CRADs to ensure adequacy and consistency of the RR for all functional areas.

6.5.5 Conduct of an RA/ORR

The team leader and team members should become familiar with DOE Order 425.1B, as supplemented by AL SD 425.1B, DOE-STD-3006-2000, and DOE-STD-3012-96. The team leader should identify functional area team members with specific expertise in areas being reviewed. The team leader and team members should be independent of the activity being assessed and should not evaluate their own work; however, members of the project's organization may serve as technical advisors as determined by the team leader.

DOE participation in facility RRs should not be permitted; however, the DOE may observe and provide oversight in any manner they desire. It is not uncommon for DNFSB and DOE-EH personnel to also observe selected ORRs.

RR team members for ORRs and RAs should review the requirements and performance objectives for the assigned functional area by developing CRADs based on core requirements. Checklists specific for each functional area may also be developed as approved in the Start-up Notification Report.

The CRADs or the checklists should be reviewed and approved by the team leader to ensure that they meet the breadth and depth prescribed for the RR level being conducted and to ensure consistency of the assessment for each functional area. The Writing Guide contained in Appendix 4 of DOE-STD-3006-2000 *click* provides details that should be considered when developing CRADs.

To facilitate the RR process, the team leader and the work-responsible line managers should meet before conducting the RR to discuss the following:

- the level of review to be performed;
- the required documentation for the activity (Click here for an example checklist of project documentation);
- operations to be observed by the team; and
- interviews to be conducted by the team

The CRAD should describe the approach for the RR, and each team member should ensure that the work-responsible line manager(s) understand the review expectations before the start of the review.

RR team members should review the activity process description, process flow diagram, hazard assessment, hazard analysis, and other project documentation against the criteria established in the CRADs or checklists. Team members should also identify additional documentation that may be required or missing.
Activity documentation may include the following:

- Documented Safety Analysis (DSA)
- HCP
- USQ
- NEPA Documentation
- Safety documentation including Radiological Work Permits (RWPs) and the instructions required to conduct operations referenced in the HCP.
- System classification documentation
- Design specifications, "as built" drawings, design reviews
- Identified nonconformances; deviations from the design criteria
- Change requests after Title II Design
- Inspection and Test Plans
- Procedures for calibration, operation, and maintenance

- Training and qualification requirements

The following approach is recommended for a RR:

1. Assemble the team on day 1 of the review for a briefing from the work-responsible line manager(s) on the current status of the facility. Introduce the team members to their counterparts. Make final determinations as to where records are that were requested for review, the evolutions/operations/drills scheduled, and where and when interviews are to be conducted. Arrange to meet daily as a team with selected work-responsible line managers to discuss status, findings, and problems.

2. After the briefing, the team should start the record review. The record review should not take more than one day. Complex documents, such as the DSA/TSR/SER, should be provided in advance as part of the team training.

   NOTE: If, through the review process, the team agrees that the RR commenced prematurely (i.e., the equipment, people, requirements, and/or the management controls systems have not been developed), the team leader should cease the RR process. The team leader should document the reasons for stopping the review to the ODL. The ODL should notify the Team Leader when to resume the RR effort.

3. On day 2, start observation of operations, selected evolutions, and drills. This should not take more than 3 days.

4. Day 4— follow up on items that have been reviewed or observed. Start interviews. This should not take more than 2 days.

5. Day 6 or 7— declare the observation part of the review complete and start the report.

6. Day 9 — out brief the review and provide a copy of the draft report.

Note: The above schedule is for a complex facility. A level 3, 4, or 5 RA may be completed in one day.

6.6 Documentation and Final Report

Once the RA/ORR has been completed and pre-start findings are corrected, the team leader should issue a written report that lists identified deficiencies. DOE-STD-3006-2000, Paragraph 5.9.3, provides guidance and should be used for ORRs and Level 1 and 2 RAs. Click here for information and format to be considered for the development of a final report.

A Level 3, 4 or 5 RA should have evidence of the completion of the checklist items listed in the POA and a listing of findings. Click here for a format that may be used. The team leader may attach any other documentation to the completed checklist that was developed during the RA. The report should recommend approval to operate upon closure of the pre-start findings.

Qualifications of RR team members should be documented in the final report for ORRs and Level 1 and 2 RAs. For Level 3, 4, or 5 RAs, where a checklist or similar document is used, the team member qualification should be confirmed by a statement in the checklist from the team leader.

The final report, along with a Readiness-to-Proceed Memorandum (see section 6.10 below and Attachment 5 of LIR300-00-08), should be submitted to the AA. If the AA is DOE, then the division leader should forward the final report with the Readiness-to-Proceed Memorandum to DOE through the ODL. A copy of the Readiness-to-Proceed Memorandum should also be provided to the PS Readiness Coordinator.

6.7 DOE Follow-On Activities

After completion of some Level 1 and 2 RAs, DOE will conduct an RA with similar breadth and depth. DOE may also choose to perform a similar assessment as Level 3 through 5 RAs, but should indicate this requirement in their response to the SNR. The levels of review are described in LIR300-00-08, "Startup/Restart of Laboratory Facilities/Activities *click here*". When the DOE process is completed, the facility personnel should document closure of pre-start findings and request approval for startup/restart. The AA should authorize startup or restart of a facility/activity. A copy of this authorization should be provided to the PS Readiness Coordinator.

After an ORR, DOE Headquarters will conduct their ORR, unless this process is delegated to the Field Office. The DOE ORRs are conducted in accordance with the requirements of DOE Order 425.1B *click* and DOE STD-3006-2000 *click*, as amplified by AL SD 425.1B *click*. When the DOE ORR has been completed, the facility and the DOE should verify closure of pre-start findings and recommend readiness to operate. The AA should then authorize startup or restart. A copy of this authorization should be provided to the PS Readiness Coordinator.

Note: The work-responsible line manager should also assure that the approved start-up process is conducted in accordance with the start-up plans reviewed during the RA/ORR.

6.8 Deficiencies

Deficiencies should be categorized as follows (additional guidance for findings is contained in DOE-HDBK-3012-96, Appendix 11 *click*):.

- Pre-start finding— involves a deficiency that must be resolved before operation commences.

- Pre-start findings require that the corrective action is completed, documented, and confirmed before approval to start is given.
- Post-start finding— involves a deficiency that is not critical to the safe operation of the system or the project and that can be corrected after the activity has commenced operation.
- Post-start findings require that the work-responsible line manager(s) develop a corrective action plan (in a timely manner) for each deficiency identified and a schedule for timely resolution of the deficiency.
- Observations— recommendations intended to improve efficiency and good work practices of daily operations.
- An observation does not require a formal response or corrective action.

6.9 Corrective Action

The work-responsible line manager(s) should track the status of action plans for post-start findings and ensure closure and documentation of the issues. The work-responsible line manager(s) should prepare a corrective action plan for each pre-start and post-start finding identified in the final report. The corrective action plan should identify the following: the activity, location, requirements references, description of the deficiency, the corrective action to be taken, the responsible person/organization for the corrective action, and the target completion date for the corrective action.

The work-responsible line manager(s) should be responsible for final verification of the corrective action to close pre-start findings. The work-responsible line manager(s) may request team leader assistance, but the responsibility should remain with the work-responsible line manager(s).

A request for waiver of a requirement for which a deficiency has been identified during an ORR or RA requires written approval by the AA. Waivers should not be considered for pre-start findings or other findings that could compromise safe operation of the activity or facility safety systems.

6.10 Readiness-to-Proceed

When a Laboratory RR (including an MSA) is completed and the pre-start findings are closed, a Readiness-to-Proceed Memorandum should be forwarded to the AA, in accordance with DOE-STD-3006-2000, paragraph 5.9.4 *click here*. A copy of the memo should be provided to both the LASO RR Program Manager and the PS Readiness Coordinator after completion of an RA/ORR. When the AA concurs with the recommendations of the Laboratory RR final report, the start of the DOE RR may commence, if required. See Attachment 5 of LIR300-00-08 *click here* for information and format for development of a Readiness-to-Proceed Memorandum.

A manageable list of the outstanding issues may be included in the memorandum. When all of the pre-start findings from the required reviews have been closed, the AA may

authorize the start of the work. The work should then be started in accordance with the start-up plan.

7. Documentation

7.1 Retention of Readiness Review Documents

Before startup or restart of an activity is approved, the RR team leader should submit all documentation used in planning and conducting the RR to the work-responsible line manager(s) as the official record package. The record package should be retained for the life of the facility and consists of the following records if required by the level of the review conducted:

- Start-up Notification Report
- POA
- IP (or checklist)
- Final report
- Finding closure documentation
- Readiness-to-Proceed Memorandum
- Formal authorization to start.

8. Training

A training course for the RR process has been developed. PS Division will provide training for selected Division Readiness Coordinators in this process. These Division Readiness Coordinators should provide the training to their division personnel. This training should be completed by team leaders and team members conducting Laboratory RRs and is also recommended for personnel preparing for a Laboratory RR.

9. References

Number	Title
DOE Order 5480.19	Conduct of Operations Requirements for DOE Facilities
DOE Order 425.1B	Start-up and Restart of Nuclear Facilities
DOE/SD AL 425.1B	Start-up and Restart of AL Activities
DOE-STD-3006-2000	Planning and Conduct of Operational Readiness Reviews (ORR)
DOE-HDBK-3012-96	Guide to Good Practices for Operational Readiness Reviews (ORR) Team Leaders Guide
LIR 220-01-01	Construction Project Management
LIR 250-02-01	Occupying or Vacating Work Space

LIR300-00-01	Safe Work Practices
LIR300-00-05	Facility Hazard Categorization
LIR300-00-06	Nuclear Facility Safety Authorization
LIR300-00-07	Non-nuclear Facility Safety Authorization
LIR300-00-08	Start-up/Restart of Laboratory Facilities/Activities
LPR270-02-00.0	Performance Assessment of Operating Limits and Start-up Tests
29 CFR 1910.119	Process Safety Management of Highly Hazardous Chemicals

10. Attachments

NOTE: The attachments are generally actual documents that are used as examples, are written based on the previous DOE orders, and are presented as *guidance only*. Other formats may be used. The attachments to this LIG may change periodically, without notice, as examples are improved. If an attachment change is made that has a significant impact on the process, then a revision to the LIG will be issued.

Attachment 1: Readiness Checklist
Attachment 2: POA Information and Format
Attachment 3: IP Information and Format
Attachment 4: ORR and LRA Levels 1 and 2 Final Report and Format Information
Attachment 5: LRA Level 3, 4 and 5 Checklist and Report Format
Attachment 6: Guidance for Management Self-Assessments associated with Readiness Reviews and MSA Checklist and Report Format
Attachment 7: White Paper on Core Requirement 12
Attachment 8: Readiness Review Improvement Feedback Form

Attachment 1

The following is a sample Readiness Checklist template that may be used as a tool to document that the people, equipment, and requirements are ready before starting the Management Self-Assessment (MSA) process. The Checklist may be tailored to fit the process or facility.

Readiness Checklist

1.0 Project Description

PROJECT : _____ **Organization:** _____

2.0 Documentation Package

NOTE: If an item is not applicable, mark it NA.

2.1 Evaluation of Impact to Facility Safety Basis

		Required for Acceptance		Documentation Complete	
	Documentation	**Yes**	**No**	**Initial**	**Date**
2.1.1	Approved Hazard Control Plan(s)				
2.1.2	Unreviewed Safety Question Determination(s)				
2.1.3	Modified SAR				

Comments: _____

Readiness Checklist—cont.

2.2 ES&H Documentation/Permits

		Required for Acceptance		Documentation Complete	
	Documentation	**Yes**	**No**	**Initial**	**Date**
2.2.1	ESH ID				
2.2.2	NEPA				
2.2.3	RCRA				
2.2.4	NESHAPS				
2.2.5	Radiological Work Permit				
2.2.6	Special Work Permit				
2.2.7	Chemical Use/Storage Plan				
2.2.8	Site Safety Plan				
2.2.9	Waste Disposal Plan				
2.2.10	Welding/Soldering Permit				
2.2.11	Transportation				

Comments:

Readiness Checklist—cont.

2.3 Configuration Management

		Required for Acceptance		Documentation Complete	
	Documentation	**Yes**	**No**	**Initial**	**Date**
2.3.1	Design Requirements Document				
2.3.2	Design Specifications				
2.3.3	Design Change Form				
2.3.4	Design Implementation Document that includes: • Failure modes and effects analysis • Test Plan • Training Plan • Design configuration package				
2.3.5	Facility Safety Plan				
2.3.6	Priority Drawings				
2.3.7	System Design Descriptions				
2.3.8	Facility Design Description				
2.3.9	Master Equipment List				
2.3.10	Master Document List				
2.3.11	Beneficial occupancy documents, including fire protection and life safety				

Comments:

Readiness Checklist—cont.

2.4 Facility Specific Equipment

All facility specific equipment required for this activity should be listed and initialed to show that this equipment has been verified. ***[What is ready? Be more specific if possible.]***

Equipment	Ready	Not Ready	Initial	Date

Deficiencies and Planned Action

Readiness Checklist—cont.

2.5 Activity Specific Equipment
All activity specific equipment required for this activity should be listed and initialed to show that the equipment is ready.

Equipment	Ready	Not Ready	Initial	Date

Deficiencies and Planned Action

Readiness Checklist—cont.

2.6 Organization Support Requirements

List all the support required from organizations other than your own. Verify that these support functions/equipment are ready to support this activity. ***[Same as previous pages!]***

Function/Equipment	**Ready**	Not **Ready**	**Initial**	**Date**

Deficiencies and Planned Action

Readiness Checklist—cont.

2.7 Operations Documentation

Documentation		Ready	Not Ready	Initial	Date
2.7.1	List all required plans and verify they are satisfactory.				
2.7.2	List all operating, emergency, and alarm response requirements and verify that they are satisfactory.				

Deficiencies and Planned Actions

Readiness Checklist—cont.

2.8 Hazard Control Plan (list applicable HCPs)

HCP #	HCP Title

Verify that the controls listed in the following sections of the hazard control plan(s) have been satisfactorily implemented (HCPs may have different sections)

		Controls in Place			
	Documentation	**Yes**	**No**	**Initial**	**Date**
2.8.1	Environmental Impacts				
2.8.2	Ionizing Radiation				
2.8.3	Special Nuclear Materials				
2.8.4	Worker Exposures				
2.8.5	Energized/Operative Systems				
2.8.6	Confined Spaces				
2.8.7	Excavations or Penetrations				
2.8.8	Material Handling/Heavy Equipment				
2.8.9	Elevated Work Surfaces				
2.8.10	Adverse Working Conditions				

Deficiencies and Planned Action

Readiness Checklist—cont.

2.9 Training Documentation

Verify required training is complete.

		Training Complete			
	Documentation	**Yes**	**No**	**Initial**	**Date**
2.9.1	Operational Requirements				
2.9.2	Emergency Response				
2.9.3	EDS Documentation				
2.9.4	OJT Documentation				

Deficiencies and Planned Actions

Readiness Checklist—cont.

2.10 Q A Documentation

		Required for Acceptance		Documentation Complete	
	Documentation	**Yes**	**No**	**Initial**	**Date**
2.10.1	Facility Quality Management Plan				
2.10.2	Project Quality Management Plan				
2.10.3	Calibration Requirements and Records				
2.10.4	Software QA Plan				

Comments:

Readiness Checklist—cont.

2.11 Emergency Response

		Plan Satisfactory		Documentation Complete	
	Documentation	**Yes**	**No**	**Initial**	**Date**
2.11.1	Verify the Site Emergency Response Requirements satisfies the needs of this activity.				

Deficiencies and Planned Actions

2.12 Facility Maintenance

		Procedures Satisfactory			
	Documentation	**Yes**	**No**	**Initial**	**Date**
2.12.1	Maintenance Requirements and Records				
2.12.2	List all of the Maintenance/Calibration of Instrumentation requirements and verify that they are satisfactory.				

Deficiencies and Planned Actions

Readiness Checklist—cont.

2.13 Security

		Required for Acceptance		Documentation Complete	
	Documentation	**Yes**	**No**	**Initial**	**Date**
2.13.1	Security Plan covers this activity				

Comments:

Readiness Checklist—cont.

3.0 Readiness Review Documentation

		Required for Acceptance		Documentation Complete	
	Documentation	**Yes**	**No**	**Initial**	**Date**
3.0.1	Project Turnover Plan (if required)				
3.0.2	Facility RA Plan of Action				
3.0.3	Project Readiness to Proceed Memo				
3.0.4	Activity Assessment Checklist or Readiness Implementation Plan				
3.0.5	Performance Test of Equipment				
3.0.6	Safety or Alarm Limits Established				
3.0.7	Confinement System Review				
3.0.9	Equipment/Instrumentation Installation Review				
3.0.10	Process Review and Walkdown				
3.0.11	Conduct of Operations crosswalk matrix (RR Core Requirement 12)				
3.0.12	App. G of UC Prime Contract RR Core Requirement 7)				

Comments:

Attachment 2

Plan of Action Information and Format

A Plan of Action is drafted in accordance with the guidance provided in paragraph 6.5.1. The following POA is a sample and may be used as a template. All of the sections in the sample are required for ORRs, and Levels 1 and 2 RAs. The Core Requirements for this review are from DOE O 425.1A and will differ from those in DOE O 425,1B. The sample was generated before LANL approval of the five levels of LRAs and therefore all of the Core Requirements are discussed. This is a Level 2 RA and only Core Requirements 1, 3, 4, 5, 8, 10, 12, 13, 15 and 18 need to be addressed. The sections marked with asterisks may be deleted for Levels 3, 4, and 5 RAs.

For Levels 3, 4 and 5 RAs, only the applicable Core Requirements need to be discussed in the Breadth Section. The sample Checklist is for Levels 3, 4, and 5 RAs where an Implementation Plan is not required.

For Levels 3, 4 and 5 the POA will consist of a Memo from line management that states the breadth of the review, who the team leader is and the prerequisites before starting the LRA. The necessary checklist items may be attached to this Memo or reference made to the documents that would be the source of the checklist items and the checklist generated when these documents are approved.

This Attachment will be replaced periodically as improved examples are produced at the Laboratory.

PLAN OF ACTION
for the
LANL READINESS ASSESSMENT
of the
CRYOGENIC PRESSURE LOADER
at the
WEAPONS ENGINEERING TRITIUM FACILITY

This Plan of Action was approved by the responsible line managers of the Los Alamos National Laboratory. Submission of this Plan of Action by the Laboratory's Engineering Science and Applications Division to the DOE LAAO for approval is part of the required action to begin the Readiness Assessment process for the startup of the Cryogenic Pressure Loader (CPL) at the Weapons Engineering Tritium Facility (WETF). This POA is for confirmation of readiness of the CPL after installation of equipment in Room 114 and completion of a Management-Self Assessment of readiness for operation of this equipment. The use of a RA for approval of this activity was recommended to DOE-LAAO in the Startup Notification Report dated _____.

For the Los Alamos National Laboratory

_____ Date: _____
Lawrie Eaton, ESA-TSE Group Leader

_____ Date: _____
Earle Marie Hanson, ESA-DO, Division Director

For the U.S. Department of Energy

_____ Date: _____
Kenneth E. Zamora, DOE/LAAO

Los Alamos
NATIONAL LABORATORY
Operated by the University of California
for the U.S. Department of Energy

1.0 *SUMMARY

DOE Order 425.1A, its standard DOE-STD-3006-95, and Supplemental Directive AL 425.1A indicate that a LANL and DOE Readiness Assessment (RA) be conducted due to the addition of a Cryogenic Pressure Loader (CPL) in Room 114, of Building 205 at the Weapons Engineering Test Facility (WETF). The purpose of the RA is to verify readiness of the CPL for operation at WETF. This Plan of Action specifies the requirements and prerequisites necessary for initiation of the LANL RA. When the LANL RA is completed and the pre-start findings are corrected a Readiness to Proceed Memorandum will be submitted to DOE-LAAO before they conduct their RA.

WETF is a government-owned, contractor-operated facility at Los Alamos National Laboratory in Northern New Mexico. The management and operations of the site are contracted to the University of California. DOE oversight is conducted by the Los Alamos Area Office.

Startup approval for the RA is the Manager of the DOE Operations Office Albuquerque or the assigned designee.

The WETF Facility is located on DOE land within the Los Alamos National Laboratory at TA-16. The Laboratory's Engineering Science and Applications Division is the organizational line manager for the operation of the WETF facility. The WETF facility is currently designated as a Hazard Category 2, non-reactor, nuclear facility. This designation will not change with the addition of the CPL in Room 114 of Building 205.

This RA will be limited to review of the work necessary to introduce the CPL and the operation of the CPL. These changes are described in three WETF USQDs (WETF-USQDs-054, 064, and 075) and their supporting attachments. All of the USQ determinations were negative.

The Contractor RA is projected to start the week of September 18,2000.

The Contractor RA Team Leader is Scotty A. Miller.

2.0 *Facility Description

The WETF Facility is located on DOE land within the Laboratory site at Technical Area-16, also referred to as S-site. The facility resides on Three-mile Mesa between Potrillo and Water Canyons. This area is at the northwest corner of the Laboratory site, a remote area of the Laboratory. WETF is located in a Limited Security Area behind the security fence with controlled access. There are no nearby facilities that have a functional interface with WETF. TA-16 includes several buildings that store high explosives. WETF is located outside the high-explosives buffer zone. Accidents from this area will not impact WETF.

The mission of WETF is to perform research and development and process tritium to meet the requirements of the present and future stockpile stewardship program, and other programs, while providing protection for workers, the public and the environment. Tritium, the primary significant hazard at WETF, is a radioactive isotope of hydrogen that emits a low-energy beta particle. The facility mission is accomplished through the design and operation of the facility and individual processes, which provides protection to personnel involved in tritium-processing

operations, minimizes routine releases of tritium to the atmosphere, and reduces the potential for tritium release that might result from an accident.

The Cryogenic Pressure Loader (CPL) system will form an important component of the Department of Energy's research efforts in Inertial Confinement Fusion (ICF). The project was initiated with several primary goals in support of the program to field cryogenic deuterium-tritium (D-T) filled targets for ICF research at the OMEGA laser at the University of Rochester's Laboratory for Laser Energetics (UR/LLE). These goals were outlined in a Memorandum of Understanding between Los Alamos National Laboratory and UR/LLE in May 1997. The CPL is designed to allow advanced testing with tritium of duplicates of several of the key components of the system being developed for UR/LLE. These components include the cell used for permeating D-T into targets, the target inserter mechanism, a gate valve, and the thermal environment necessary for allowing targets to layer. Experiments performed within the CPL will evaluate the permeation and layering methods to be used at UR/LLE as well as quantify issues of tritium contamination and off gassing of cryostat components.

> The goals and potential applications of the CPL extend, however, beyond the initial measurements in support of UR/LLE. Cryogenic D-T filled targets, of the type that will be studied in the CPL, will be used in experimental campaigns to achieve fusion ignition at the National Ignition Facility (NIF) at Lawrence Livermore National Laboratory. The CPL will be the first system in the world to be able to permeation fill and study targets of this type with tritium making it a valuable laboratory for studying the properties of cryogenic ignition targets and their associated mounting structures. Not only will the CPL be a unique laboratory, but lessons learned from its development are already being applied as plans are developed for future cryogenic target filling systems, including the system to fill ignition targets and load them into the target chamber at NIF.

The CPL is designed to fill (one at a time) plastic targets that consist of spherical shells 1-2 mm in diameter by diffusing D-T gas through their walls. Fill pressures can be as high as 1200 atmospheres and the fill temperature can range from room temperature to 100° C. The pressure in the permeation cell must be slowly increased during this process to avoid causing the shells to buckle. At the end of the permeation process there is pressure equilibrium between the inside and the outside of the targets. Removing the outside gas at this stage would cause the targets to burst, so the CPL is designed to cool the whole permeation cell to cryogenic temperatures (<30 K). At these low temperatures the D-T gas liquefies and has a relatively low vapor pressure so the shells will not burst when the surrounding excess D-T is removed. Target shells of this type require constant cryogenic handling. Following removal of the filled target shells from the permeation cell they will be manipulated into a special thermal environment and allowed to undergo beta-layering at ~19 K. Beta-layering is a natural process in which the unique properties of tritium cause the D-T to form a uniform spherical shell on the interior of the plastic target shell. The quality of that D-T shell, which is extremely important for successful experiments both at UR/LLE and NIF, will be investigated optically within the CPL. Experiments performed in the CPL will be the first to quantify this crucial layering process in targets produced to actual ignition specifications. The installation and testing is described in three WETF USQDs: 1) USQD 54, Facility Utility Services for the Cryogenic Pressure Loader

(CPL), 2) USQD 64, Installation of the Cryogenic Pressure Loader in WETF, and 3) USQD 75, Cold Testing of Cryogenic Pressure Loader (CPL) Glove Box Equipment.

The primary focus of this RA is to confirm readiness of operations of the Cryogenic Pressure Loader, a new activity in the facility.

3.0 *Identification of Responsible Contractor

The University of California under contract with the U.S. Department of Energy operates the Los Alamos National Laboratory. The Laboratory's Engineering Science and Applications (ESA) Division is the organizational line manager for the operation of the WETF Facility. The Tritium Science and Engineering Group (ESA-TSE) has been designated by the ESA Division as the operator for the WETF Facility.

4.0 *Designation of Action – New Start of CPL

The addition of the CPL to Room 114 is designated a startup of an activity after completion of modifications to the facility to include this new equipment. The operation will remain a Hazard Category 2, non-reactor, nuclear facility, as described in DOE-STD-1027-92. This category is based on the total inventory of tritium at the facility. The acquisition cost of the CPL is approximately 3.5 million dollars.

5.0 Proposed SCOPE for THE RA

The RA for the startup of operation of the CPL in WETF will be limited to the installation of the Cryogenic Pressure Loader in Room 114, the testing and operation of the system, and the adequacy of the procedures and the training and qualification of the operators.

Proposed BREADTH for the RA

A graded application of DOE O 425.1A, *Startup and Restart of Nuclear Facilities*, and DOE STD-3006, *Planning and Conduct of Operational Readiness Reviews*, will be used as process guidance for this RA.

Listed below are all 20 minimum Core Requirements taken from DOE O 425.1A, three of which are only applicable to DOE RAs. Listed below each of the applicable Core Requirements is the description of the breadth required for this RA.

1. ***There are adequate and correct procedures and safety limits for operating the process systems and utility systems***.

   Assessment will focus on procedures related to operation and maintenance of the CPL and the CPL Startup Plan.

2. ***Training and qualification programs for operations and operations support personnel have been established, documented, and implemented. (The training and qualification program encompasses the range of duties and activities required to be performed.)***

   Not Applicable.

This item is beyond the scope of the RA for an activity to be started in an operational facility. The training and qualification for the CPL personnel will be evaluated in Core Requirement 3.

3. ***Level of knowledge of operations and operations support personnel is adequate based on reviews of examinations and examination results, as well as selected interviews of operating and operations support personnel.***
Assessment will ensure at least one person is qualified to operate and maintain the CPL and that the training program has been revised and includes training on operation, maintenance and facility support of the CPL.

The level of knowledge of the person/persons qualified on this system will be evaluated.

4. ***Facility safety documentation is in place that describes the "safety envelope" of the facility. The safety documentation should characterize the hazards/risks associated with the facility and should identify mitigating measures (such as systems, procedures, and administrative controls) that protect the workers and the public from those hazards/risks. Safety systems and systems essential to worker and public safety are defined, and a system to maintain control over the design and modification of facilities and safety-related systems is established.***

Only the CPL impact on the facility "safety envelope" and the CPL Hazard Analysis will be evaluated.

5. ***A program is in place to confirm and periodically reconfirm the condition and operability of safety systems, including safety-related (significant) processes and utility systems. This includes examinations of records of test and calibration of the safety systems and other instruments that monitor limiting conditions of operation or that satisfy Technical Safety Requirements. All systems are currently operable and in a satisfactory condition.***

The RA will verify that the facility operators understand the impact of CPL on facility safety equipment.

6. ***A process has been established to identify, evaluate, and resolve deficiencies and recommendations made by oversight groups, official teams, audit organizations, and operating contractor.***

Not Applicable.

This item is beyond the scope of the RA for an activity to be started in an operational facility.

7. ***Formal agreements establishing requirements are in place between the operating contractor and DOE, via the contract or other enforceable mechanism, which govern the safe operations of the facility. A systematic review of the facility's conformance to these requirements has been performed. These requirements have been implemented in the facility, or compensatory measures are in place, and formally agreed to during***

the period of implementation. The compensatory measures and the implementation period are approved by DOE.

Not Applicable.

This item is beyond the scope of the RA for an activity to be started in an operational facility.

8. Management programs are established, sufficient numbers of qualified personnel are provided, and adequate facilities and equipment are available to ensure operational support services (e.g., training, maintenance, waste management, environmental protection, industrial safety and hygiene, radiological protection and health physics, emergency preparedness, fire protection, quality assurance, and engineering) are adequate for operations.

The intent of this item is satisfied by core requirements 1-5 above.

9. A routine and emergency operations drill program, including program records, has been established and implemented.

Not Applicable.

This item is beyond the scope of the RA for an activity to be started in an operational facility.

10. An adequate start-up or restart test program has been developed that includes adequate plans for a graded operations testing to simultaneously confirm operability of equipment, the viability of procedures, and the training of operators.

The RA will review the plans to proceed from permission to startup to routine operations. After approval to operate the system, the designated Subject Matter Expert will observe operator performance of the plans listed above as final verification of operability of equipment, training of personnel, viability of procedures.

11. Functions, assignments, responsibilities, and reporting relationships are clearly defined, understood, and effectively implemented with line management responsible for control of safety.

Not Applicable.

This item is beyond the scope of the RA for an activity to be started in an operational facility.

12. Conduct of operations is adequately implemented in the facility.

The conduct of operations will be limited to procedure adequacy and performance by the operator, and the ability of the facility to maintain the safety envelope.

13. There are sufficient numbers of qualified personnel to support safe operations.

This item is evaluated in core requirement 3 above.

14. A program is established to promote a site-wide culture in which personnel exhibit an awareness of public and worker safety, health, and environmental protection requirements and through their actions, demonstrate a high priority commitment to comply with these requirements.

Not Applicable.

This item is beyond the scope of the RA for an activity to be started in an operational facility.

15. The facility systems and procedures, as affected by facility modifications, are consistent with the description of the facility, procedures, and accident analysis included in the safety basis.

Verify that a Configuration Management system has been effective in maintaining drawings, procedures and safety documentation current for installation of the CPL within the facility.

16. DOE Reviews only

17. DOE Reviews only

18. Modifications to the facility have been reviewed for potential impacts on procedures, training, and qualification. Procedures have been revised to reflect these modifications, and training has been performed to these revised procedures.

This requirement is satisfied by core requirement 10 above.

19. The technical and management qualifications of contractor personnel, responsible for facility operations, are adequate.

Not Applicable.

This item is beyond the scope of the RA for an activity to be started in an operational facility.

20. DOE Reviews only

6.0 RA Prerequisites

The prerequisite conditions to conduct the Contractor Readiness Assessment are:

1. CPL Operators have been trained, have adequate knowledge of the new systems and are qualified in accordance with WETF requirements as verified by the management self assessment.

2. The Operating Procedures and Startup Plan for the CPL have been verified to be adequate for operation of the CPL as verified by management self assessment.
3. The CPL system is operable as verified by management self assessment.
4. The CPL system P&IDs and System Design Descriptions have been updated as verified by management self assessment.
5. The management self-assessment pre-start findings have been corrected.

7.0 Estimated RA Start Date And Duration

The Laboratory RA is projected to start the week of September 18, 2000. The estimated duration based on approach and scope identified by this plan, is 3 days. After any prestart findings identified by the Contractor RA Team have been corrected, a Readiness to Proceed Memorandum will be submitted to the DOE Authorization Authority and the DOE will conduct a RA. It is anticipated that the DOE RA can start on or after September 25, 2000.

8.0 Proposed RA Team Leader

The proposed Contractor RA Team Leader is Scott A. Miller, of ESH-17. Mr. Miller meets all of the requirements of Paragraph 5.1 of DOE –STD-3006-95.

9.0 AUTHORIZATION Authority

The authorization authority for the start of the LRA is the ESA-TSE Group Leader.

Sample Checklist to be added to a POA for Level 3, 4, 5, and 6 RAs where an IP is not required.

Function Tester-Real Time Mass Spectrometer (FT-RTMS) RA Checklist

The following items will be verified by the RA team. Issues identified will be listed in the LRA report. The pre-start issues will be corrected before the Readiness to Proceed Memo is forwarded.

1. The prerequisites for the RA listed in the POA have been completed.
2. The Operating Instruction for the FT-RTMS can be performed as written and provides for verification of the OSR. (Satisfactory walk through of the OI will satisfy this requirement)
3. The required operators are familiar with the procedure and qualified to perform it.
4. Operators demonstrate an adequate level of knowledge and appropriate Conduct of Operations while performing the OI.

(This information is placed in the Checklist and Report Format included as Attachment 6)

Attachment 3

Implementation Plan Information and Format

1. An Implementation Plan (IP) is drafted in accordance with the guidance contained in paragraph 6.5.2. A sample IP is included for information.
2. IPs are only required for ORRs and Levels 1 and 2 RAs. When a checklist is used in place of an IP, it may be attached to the POA as shown in Attachment 3. An IP may be used for lower level RAs if desired.

Readiness Assessment

Implementation Plan

for operation of the

Cryogenic Pressure Loader

at the

WEAPONS ENGINEERING TRITIUM FACILTIY

at

LOS ALAMOS NATIONAL LABORATORY

DOE Order 425.1A, its standard DOE-STD-3006-95, and Supplemental Directive AL 425.1A indicate that a LANL and DOE Readiness Assessment (RA) be conducted due to the addition of a Cryogenic Pressure Loader (CPL) in Room 114, of Building 205 at the Weapons Engineering Test Facility (WETF). The purpose of the RA is to verify readiness of the CPL for operation at WETF. This Implementation Plan (IP) specifies the requirements and prerequisites necessary for initiation of the contractors RA and describes the approach for confirmation of readiness and approval of the CPL operations.

Approved _____ **Team Leader**

Scott A. Miller

1.0 INTRODUCTION

The mission of WETF is to perform research and development and process tritium to meet the requirements of the present and future stockpile stewardship program, and other programs, while providing protection for workers, the public and the environment. Tritium, the primary significant hazard at WETF, is a radioactive isotope of hydrogen that emits a low-energy beta particle. The facility mission is accomplished through the design and operation of the facility and individual processes, which provides protection to personnel involved in tritium-processing operations, minimizes routine releases of tritium to the atmosphere, and reduces the potential for tritium release that might result from an accident.

1.1 Background

Typical WETF tritium-processing activities include: repackaging tritium into smaller quantities, removing ^{3}He decay products and other impurities from gaseous tritium, mixing tritium with other gases, analyzing tritium as mixtures, loading tritium onto getter materials, repackaging tritium and other gases to user specifications, performing various user-defined experiments using tritium, unloading (depressurizing) containers of tritium, and functionally testing weapons components and apparatus containing tritium.

The primary focus of this RA is the addition of the Cryogenic Pressure Loader to the facility and operation of the new equipment.

1.2 Facility Description

The WETF Facility is located on DOE land within the Laboratory site at Technical Area-16, also referred to as S-site. The facility resides on Three-mile Mesa between Potrillo and Water Canyons. This area is at the northwest corner of the Laboratory site, a remote area of the Laboratory. WETF is located in a Limited Security Area behind the security fence with controlled access. There are no nearby facilities that have a functional interface with WETF. TA-16 includes several buildings that store high explosives. WETF is located outside the high-explosives buffer zone. Accidents from this area will not impact WETF.

The Cryogenic Pressure Loader (CPL) system will form an important component of the Department of Energy's research efforts in Inertial Confinement Fusion (ICF). The project was initiated with several primary goals in support of the program to field cryogenic deuterium-tritium (D-T) filled targets for ICF research at the OMEGA laser at the University of Rochester's Laboratory for Laser Energetics (UR/LLE). These goals were outlined in a Memorandum of Understanding between Los Alamos National Laboratory and UR/LLE in May 1997. The CPL is designed to allow advanced testing with tritium of duplicates of several of the key components of the system being developed for UR/LLE. These components include the cell used for permeating D-T into targets, the target inserter mechanism, a gate valve, and the thermal environment necessary for allowing targets to layer. Experiments performed within the CPL will evaluate the permeation and layering methods to be used at UR/LLE as well as quantify issues of tritium contamination and off gassing of cryostat components.

The goals and potential applications of the CPL extend, however, beyond the initial measurements in support of UR/LLE. Cryogenic D-T filled targets, of the type that will be studied in the CPL, will be used in experimental campaigns to achieve fusion ignition at the National Ignition Facility (NIF) at Lawrence Livermore National Laboratory. The CPL will be the first system in the world to be able to permeation fill and study targets of this type with tritium. It will become a valuable laboratory for studying the properties of cryogenic ignition targets and their associated mounting structures. Not only will the CPL be a unique laboratory, but lessons learned from its development are already being applied as plans are developed for future cryogenic target filling systems, including the system to fill ignition targets and load them into the target chamber at NIF.

The CPL is designed to fill (one at a time) plastic targets that consist of spherical shells 1-2 mm in diameter by diffusing D-T gas through their walls. Fill pressures can be as high as 1200 atmospheres and the fill temperature can range from room temperature to 100° C. The pressure in the permeation cell must be slowly increased during this process to avoid causing the shells to buckle. At the end of the permeation process there is pressure equilibrium between the inside and the outside of the targets. Removing the outside gas at this stage would cause the targets to burst, so the CPL is designed to cool the whole permeation cell to cryogenic temperatures (<30 K). At these low temperatures the D-T gas liquefies and has a relatively low vapor pressure so the shells will not burst when the surrounding excess D-T is removed. Target shells of this type require constant cryogenic handling. Following removal of the filled target shells from the permeation cell they will be manipulated into a special thermal environment and allowed to undergo beta-layering at ~19 K. Beta-layering is a natural process in which the unique properties of tritium cause the D-T to form a uniform spherical shell on the interior of the plastic target shell. The quality of that D-T shell, which is extremely important for successful experiments both at UR/LLE and NIF, will be investigated optically within the CPL. Experiments performed in the CPL will be the first to quantify this crucial layering process in targets produced to actual ignition specifications. The installation is described in WETF USQD _____.

2.0 PURPOSE

The purpose of this Implementation Plan is to provide both the CRAD and the guideline for the conduct of the LANL RA for authorization of operations of the CPL in WETF. The RA will confirm that line management has prepared the facility, the new CPL equipment, new operating procedures and instructions, and that appropriate personnel are adequately trained and qualified to perform these operations.

3.0 SCOPE

Management of the WETF operations will be conducted through the use of existing programs within the ESA-TSE Group. Therefore, this RA will be conducted using a graded approach, focusing primarily on WETF operations and maintenance of the new CPL equipment. The RA will consist of document reviews, personnel interviews, and observations of CPL operational evolutions.

Functional areas for the RA will be the following:

Operations/Procedures/Safety Envelope Verification (OP)
Maintenance/Configuration Management (MT)
Training (TR)

Minimum Core Requirements specified in DOE O 425.1A will be utilized to guide the assessment approach within each of the functional areas as described in the POA.

The Team Leader for the RA is Scotty A. Miller, a member of the ESH-17 Group.

4.0 RA PREREQUISITES

The prerequisite conditions to conduct the Laboratory Readiness Assessment are:

6. CPL Operators have been trained, have adequate knowledge of the new systems and are qualified in accordance with WETF requirements as verified by the management self assessment.
7. The Operating Procedures and Startup Plan for the CPL have been verified to be adequate for operation of the CPL as verified by management self assessment..
8. The CPL system is operable as verified by management self assessment.
9. The CPL system P&IDs and System Design Descriptions have been updated as verified by management self assessment.
10. The management self-assessment pre-start findings have been corrected.

5.0 OVERALL APPROACH

The RA provides the Approval Authority with independent, objective evidence of the readiness to begin CPL operations, with tritium, at WETF.

5.1 Readiness Review

A team comprised of technical experts will assess the adequacy of selected performance objectives and criteria, facility modifications, and personnel training. The review will be guided by a set of objectives and criteria provided in Appendix II of this document. The criteria and review approaches include record reviews, observation of shift performance and evolutions, followed by interviews of involved personnel.

The RA will be a performance-based review with the emphasis on reviewing the performance of procedures by the trained and qualified personnel and verification of proper installation of the new equipment. A graded approach will be taken in the conduct of this RA. Since major

programs necessary for operation of the WETF are already in place within the ESA-TSE Group, this RA will primarily seek to assure the CPL is ready to operate.

The Team Leader, in consultation with the applicable team member, has the responsibility for making the determination of whether a discrepancy requires pre-startup or post-startup correction. Section 9.0 discusses this process. Appendix III provides the criteria used to aid in this determination.

At the completion of the RA, a report will be prepared and will summarize the review and comment on the readiness to operate the CPL. The Team Leader will sign the Final Report and transmit it to the Approval Authority.

6.0 RA PREPARATIONS

Prior to commencement of onsite RA activities, training of team members will be conducted and will consist of site and facility familiarization, necessary radiological and safety training for unrestricted site access, facility program status, and familiarization with the RA Plan and associated objectives. Each team member will spend an appropriate amount of time receiving requisite training, tour the facilities included in the scope, review pertinent documentation, and interview selected facility personnel so as to become familiar with WETF operations. The team member will have assessment experience through previous assessments. By their selection, the Team Leader certifies that each team member is technically competent, has assessment experience, is independent, and through the familiarization process, familiar with the site. These qualifications will be formally documented in the Final Report.

7.0 ASSESSMENT PROCESS AND OBJECTIVES

The RA team will conduct their assessments in accordance with this plan. The CRADs in Appendix II provides defined bases for conducting the RA within the context of the scope set forth by the core requirements of DOE O 425.1A. The Team Leader will review the efforts of the team members to assure that all objectives are thoroughly assessed.

The CRAD is based on the requirements contained within DOE orders and other regulatory documents and the potential hazards of operations. The review approaches include plans for reviewing procedures, interviewing personnel, inspecting equipment and facilities, and observing operations.

The objectives of the RA, grouped by their applicable functional area, are presented in the CRAD in Appendix II. In aggregate, these objectives cover the breadth of review required by core requirements contained in DOE O 425.1A as described in the POA.

8.0 ADMINISTRATION

To facilitate team coordination and the exchange of information, the team will meet on the first day of the review and will conduct an out brief with the line managers on completion of the review.
Responsibility for quality assurance of the review process rests with the Team Leader and includes Team Leader approval of all RA team members, oversight of the review, onsite peer review of the findings of the technical experts, and specification of the form of reports and retention of records on which the team's conclusions are based. Any RA team member is free to issue a dissenting opinion in the Final Report. This independence, coupled with the professional experience of the participants, assures an objective and comprehensive review that will provide line management with confidence that key findings are presented in an objective and responsible manner.

9.0 REPORTING AND RESOLUTIONS

9.1 Forms

During the conduct of the RA, documentation of review findings and the assembly of objective evidence of operational readiness will be the responsibility of the individual team members in accordance with specific directions given below. Two types of administrative forms will be used to accurately document onsite inspection activities and findings.

The Assessment Form (Form 1) is used to document the methods and actions taken by a team member in the criteria evaluation process. Each Form 1 covers a specific objective and lists the means the team member used to measure the site's performance relative to the objective provided in the CRAD. The form should be complete enough to allow a reviewer of the form to follow the inspection logic and means utilized to verify the facility's performance with respect to the criteria and to thereby validate the RAs completeness and adequacy. The write up will clearly describe the approach taken to review the criterion. Every effort will be made to ensure that the approach used is what the CRAD called for. If, for some reason, the approach used does not exactly match the approach described in the CRAD, the reason will be documented. The conclusion will specify if the criteria for the particular objective have been met.

The Deficiency Form (Form 2) is used to document the findings identified during the criteria evaluation process. A separate Form 2 will be generated for each finding related to a particular core requirement. For instance, in reviewing a CRAD, or portion of a CRAD, an inspector will generate a single Form 1 which describes the methods utilized in the investigation. If three distinct findings are discovered the inspector will then generate three Form 2s to detail the deficiencies. A single Form 2 may be used to identify a generic problem for which a number of individual examples are listed. Clear communication is the objective and the specific number of Form 2s used to detail findings will necessarily be up to the discretion of the team member and Team Leader.

A copy of these forms will be provided to the CPL team leader for action or information as appropriate. The blank forms are provided in Appendix IV. The completed forms will be in the Final Report.

9.2 Finding Classification
The Team Leader, in consultation with the applicable team member, has the responsibility for making the determination of whether a finding is pre-start or post start. Appendix III provides the criteria to be used to aid in this determination. The results of this determination are documented on the appropriate Form 2.

9.3 Finding Resolution
While it is outside the purview of the RA to assign responsibility for finding resolution, the Team Leader may make recommendations concerning these responsibilities. The line managers will be responsible for closing all findings pertaining to the CPL including the approval of all associated action plans.

9.4 Final Report Format
The Final Report is a distillation of the information contained in the forms used to review activities and identify issues. The report will identify any deficiencies found during the review and will characterize the time frame for their resolution by identifying them as pre-start or post start findings. It is signed by the Team Leader. Each Technical Expert will have been provided an opportunity to make a statement regarding any differing technical opinion(s) for attachment to this report.

The Final Report will adhere to the following format:

TITLE PAGE - the page that states the facility/process, the site, and the date(s) of the RA.

SIGNATURE PAGE - the page used by the Team Leader to promulgate the final version of the report.

TABLE OF CONTENTS - identifies all sections and subsections of the report, illustrations, tables, charts, figures, and appendices.

EXECUTIVE SUMMARY - a summary of the review, findings, and readiness determination. Additionally, there shall be a statement as to whether any identified non-conformances.

INTRODUCTION - includes a brief background of facility/process under review, purpose of review, and the scope of the RA activity.

RA EVALUATION - a discussion on each functional area and conclusion as to the readiness for each area.

LESSONS LEARNED - identifies problems and/or successes encountered during the review that could be applied to future RAs, or to the construction, design, or decommissioning of DOE facilities.

DISSENTING OPINIONS - Dissenting opinions give the individual Team Members an opportunity to voice concerns that they feel were not adequately addressed in this report.

APPENDICES - Appropriate data will be provided as appendices to support the conclusions drawn in the report. These will include:

Appendix I	**Team Composition and Qualification Summaries**
Appendix II	Criteria and Review Approach Document (CRAD)
Appendix III	Guidelines for Determining Pre-Start/Post-Start Findings
Appendix IV	Completed Form 1s
Appendix V	Completed Form 2s

10.0 SCHEDULE

The LRA will commence upon satisfactory completion of all identified prerequisites. The draft LRA Final Report will be completed onsite and team members will be afforded the opportunity to review the Final Report prior to its issuance.

11.0 TEAM COMPOSITION

Team Leader	**Scotty A. Miller, ESH-17**
Administrative Assistant	Helen Lavato
Operations/Procedures/ Safety Envelope Verification (OP)	Scotty A. Miller, ESH-17
Maintenance/Configuration Management (MT)	TBD
Training (TR)	TBD

12.0 APPENDICES

Appendix I: Team Biographies

Appendix II: Criteria and Review Approach Document (CRAD)

Appendix III: Finding Classification Determination

Appendix IV: RA Assessment and Deficiency Forms

APPENDIX I

TEAM BIOGRAPHIES

(samples)

Wolfgang R. Dworzak has a Bachelor of Arts degree in Chemistry, a Bachelor of Science and a Master of Science degree in Chemical Engineering. He has 21 years experience working as a Chemical Engineer at DOE process facilities. He has eleven years experience at Los Alamos National Laboratory (LANL). At LANL he has been a Project Leader for numerous projects. He lead the Special Recovery Line Upgrades and Operation project, which is a plutonium weapon component processing system, capable of dealing with tritium contamination, at TA-55. He lead the ARIES project, which is a project for compliant, innovative disassembly of retired plutonium pits. He managed the industrial partnership project, to develop open architecture machine tool controllers that interfaced with consumer-priced hardware and software platforms. He was also in charge of the Process Technology Transfer Project and was responsible for selection, development, and incorporation of new technologies for plutonium processing into a major plant upgrade. He is currently assigned to NMT-11 where he is leading four additional projects. At Hanford he was the Manager of a Chemical Engineering Laboratory, a process engineer and leader of a Plutonium Process Development Team. He has participated in numerous readiness reviews. He is currently an active member of the Tritium Operations Safety Committee.

James E. Grise has a Bachelor of Science degree from the United States Naval Academy and a Master of Marine Affairs degree from the University of Rhode Island. He has forty years technical and management experience. He served over 29 years in the US Navy, with 26 years in the nuclear power program. He commanded two nuclear powered submarines and a submarine tender. He completed his naval service as a Captain in the US Navy. For the past eleven years he has worked as a consultant to DOE and DOE Contractors. During that time he has acted as a Mentor for DOE and several DOE Contractors. He is an expert in Conduct of Operations, Maintenance, Integrated Safety Management, Safety Basis documentation, Operational Criticality Safety, Radiological Controls, Operational Readiness Reviews, Team Building and Assessment and Management of troubled facilities. As a consultant to DOE he assisted with the training of Facility Representatives and Engineering Staff personnel, and the development and implementation of DOE systematic oversight programs. He has developed training and taught DOE and contractor personnel in Occurrence Reporting, Price Anderson Amendments Act, Observation Techniques, Conduct of Critiques, Operational Readiness Reviews and Integrated Safety Management. He has participated as a team member and/or as a senior safety expert in 14 DOE ORRs/RAs, and 10 Contractor ORRs/RAs including assessments at SRS, Oak Ridge, Pantex, Rocky Flats, Los Alamos, and the Nevada Test Site. He is currently assigned as a Mentor at the Los Alamos National Laboratory where he has assisted with resumption of troubled facilities and preparation of facilities for ORRs and RAs. He is currently providing assistance to the Los Alamos Criticality Facility (TA-18) and the Weapons Engineering and Tritium Facility (WETF).

APPENDIX II
CRITERIA AND REVIEW APPROACH DOCUMENT

Operations/Procedures/Safety Envelope Verification (OP)

OBJECTIVE

OP.1 Level of knowledge of CPL operations personnel is adequate based on observation of operator performance and selected interviews of operating personnel. There are sufficient numbers of qualified personnel to support safe operations. The technical and qualifications of personnel responsible for facility operations are adequate. **(CORE REQUIREMENTS 2, 3, and 13)**

Criteria

The level of operator knowledge is adequate to operate safely. This includes knowledge of the CPL operation and facility support provided during CPL operation. Operators demonstrate the ability to carry out normal, abnormal, and emergency procedures. (5480.19 Ch. XIII; 5480.20A, Ch. I, section 7 and 8, and Ch. IV, section 5)

Operations personnel retain a practical and adequate understanding of facility systems and operations. Operators demonstrate a working knowledge of facility systems and components related to safety. These personnel also give adequate attention to and retain an adequate knowledge of health, safety and environmental protection issues. (5480.19, Ch. XIII; 5480.20A, Ch. I, section 7 and 8, and Ch. IV, section 5; 10 CFR 830.120)

Minimum staffing requirements have been established for CPL operators and WETF operations personnel, and supervisors. These staffing levels are met. (CPL Hazard Analysis, 5480.20A, para 9)

Approach

Record Review: Review practical training documentation to determine if they adequately test the operators understanding of technical fundamentals, facility systems, and operating procedures.

Interviews: Interview operators and supervisors to assess their understanding of CPL operations, facility processes, procedures, and fundamentals.

Shift Performance: Observe normal CPL operations to assess technical understanding and ability of the operators and supervisors to carry out their duties and to safely operate the systems required for CPL operations. Observe operator performance during selected abnormal conditions.
Assess staffing levels while observing routine operations to determine if they are adequate.

OBJECTIVE

OP.2 There are adequate and correct procedures for operating and maintaining the process systems and designated utility systems. Procedures have been revised to reflect modifications to the facility. Procedures, as affected by facility modifications, are consistent with the description of the facility, procedures, and accident analysis included in the safety basis. The facility demonstrates a formal approach in the conduct of operations. **(CORE REQUIREMENTS 1, 12, 15, and 18)**

Criteria

Operations, maintenance, and surveillance test procedures meet or exceed the requirements of the guidance provided in DOE Order 5480.19, Conduct of Operations. (5480.19, Ch. XVI; 10 CFR 830.120; 4330.4B, Ch. II, section 6)

Operations, maintenance, and surveillance test procedures adequately implement and are consistent with the approved safety basis. (5480.19, Ch. XVI; 5480.22, para 9.; 10 CFR 830.120)

Conduct of operations for the facilities at the Laboratory are implemented through Integrated Safety Management and Facility Safety Plans. The RA will verify that conduct of operations is implicit in the operation of the WETF Facility.

Operations personnel demonstrate the principles of the conduct of operations requirements during the CPL operations. Adequate performance will be demonstrated in the following areas:

- Procedure adequacy and training. Procedures cover all types of operations and can be performed as written. The operators are familiar with the procedures and demonstrate adequate control of safety features.
- Facility personnel are proficient and can support CPL operations and maintain the WETF safety envelope.
- Housekeeping is adequate, including adequate control of hazardous materials, transient combustibles, and ignition sources. (5480.19, para 4)

Approach

Record Review: Review procedures for implementation of the safety envelope. Assess the adequacy of the review and approval process for procedures. Assess the currency of procedures and verify current configuration of safety systems is reflected in operations, maintenance and surveillance procedures.

Review operating procedures and recently completed operations logs, and other plant records of note to assess compliance with WETF operating principles

Interviews: Interview operators and supervisors to assess their understanding of how they verify the latest approved revision of a procedure. Interview support staff personnel responsible for procedure writing and revision to assess their understanding of procedure control requirements, validation process, and implementation of safety requirements. Interview operator and supervisors and assess their understanding of site procedure compliance policy.

Interview operators and supervisors to assess their understanding of the CPL operating principles in the performance of their duties.

Shift Performance: While observing CPL operations, determine if the facility procedures are adequate in content, level of detail, and acceptance criteria, and properly implement safety requirements. Verify procedures used by the operators are properly controlled to ensure only the latest revision is used. Verify that operators are following site procedure compliance policy. While observing operations, determine if the personnel are proficient in the performance of the procedures and the work is performed in a safe and effective manner, and that housekeeping is adequate.

OBJECTIVE

OP.3 A program is in place to confirm and periodically reconfirm the condition and operability of safety systems, including safety-related process systems and safety-related utility systems. This includes examination of records of tests and calibrations of the safety system and other instrument's monitoring limiting conditions of operation or that satisfy safety requirements. All safety-related process and utility systems are currently operable and in satisfactory condition. **(CORE REQUIREMENT 5)**

Criteria

Confirmation of continued compliance with safety requirements, including clearly defined surveillance intervals and periodic self-assessments, is required by procedures. Adequate surveillance test procedures and acceptance criteria have been established to support safe operation and are consistent with the approved operating basis for the facility. (5480.22, para 9, 10, Attachment 1, Background, 5480.23, para 8, Attachment 1, section 4)
Completed surveillances and tests are reviewed and follow-up actions are documented. 5480.22, para 9.e.; 5480.19, Ch. I and II; 10 CFR 830.120, Conduct of Operations Matrix

Approach

Record Review: Review surveillance checks to determine if acceptance criteria are established and being met during the performance of periodic checks. Verify that operating procedures are technically correct and implement safety requirements. Review a listing of outstanding safety system deficiencies identified through the corrective maintenance program, preventive maintenance program, surveillance test program, or other reporting process to assess the condition of facility systems to support safe operations.

Interviews: Interview personnel associated with the system surveillance program to assess their understanding of program requirements and responsibilities.

Shift Performance: Walk down one of the defense-in-depth systems with a facility operator to assess operability and equipment condition.

Maintenance/Configuration Management (MT)

OBJECTIVE
MT.1 Facility safety documentation is in place that describes the "safety envelope" of the facility. The safety documentation should characterize the hazards/risks associated with the facility and should identify mitigating measures (systems, procedures, administrative controls, etc.) that protect workers and the public from those hazards/risks. A system to maintain control over the design and modification of facilities and safety-related systems is established. **(CORE REQUIREMENT 4)**

Criteria
The safety documentation addresses appropriate hazards/risks associated with operations. Administrative controls are in place to ensure that repairs (or modifications) are adequately analyzed to identify and to ensure that design changes are documented and approved prior to implementation. (5480.23, para 8, Attachment 1, sections 3 and 4, DOE-STD-1073-93, Ch. 1.3)

Approach
Record Review: Review the Hazard Analysis for operation of the CPL at WETF to assess whether it includes appropriate hazards/risks associated with WETF operations. Review recent design changes and modifications to the facility to ensure that the addition of the CPL has been reflected in drawings and documents available to operators and maintenance personnel.

Interviews: Interview personnel associated with the configuration management program to assess their understanding of program requirements and responsibilities.

Shift Performance: Perform a walk down of the CPL installation to determine that there are no uncontrolled modifications to safety systems. This walk down should evaluate the accuracy of drawings and other documentation for plant operation and maintenance.

OBJECTIVE
MT.2 The facility systems and procedures, as affected by facility modifications, are consistent with the description of the facility, procedures, and accident analysis included in the safety basis. **(CORE REQUIREMENT 15)**

Criteria
Administrative controls are in place to ensure that WETF the CPL modifications are adequately analyzed to ensure that design changes are documented and approved prior to implementation. Verify that the modification is reflected in drawings.

Approach
Record Review: Review the documentation associate with recent modifications. Determine if the changes have been documented in accordance with applicable procedures. Assess the status of the database for installed equipment.

Interviews: Interview personnel associated with the configuration management program to assess their understanding of program requirements and responsibilities.

Shift Performance: Perform a facility walk down of a related process system to evaluate the accuracy of drawings and other documentation for plant operation and maintenance.

OBJECTIVE
MT.3 Level of knowledge of maintenance support personnel is adequate based on observation of performance and selected interviews. **(CORE REQUIREMENT 3)**

Criteria
Maintenance support personnel demonstrate the ability to carry out normal, abnormal, and emergency procedures under their cognizance. (4330.4B, Ch. II, section 5; 5480.20A, Ch. I, para 7)
Maintenance support personnel demonstrate a working knowledge of facility systems and components related to safety. These personnel also give adequate attention to health, safety and environmental protection issues. (4330.4B, Ch. II, section 5; 5480.20A, Ch. I, para 7; 10 CFR 830.120)

Approach
Record Review: Review selected maintenance procedures for adequacy.

Interviews: Interview maintenance support personnel to assess their understanding of their actions when responding to abnormal and emergency conditions as well as their understanding of how these actions relate to the safety basis for operations. Determine if these personnel have an adequate knowledge of health, safety, and environmental protection issues.

Shift Performance: Observe routine evolutions and normal operations, to assess the ability of maintenance support personnel to safely perform tasks in accordance with approved procedures.

OBJECTIVE

MT.4 An adequate startup test program has been conducted which verifies the operability and integration of the CPL equipment. The system is in a material condition to support the safe startup of work. **(CORE REQUIREMENT 10)**

Criteria

A plan exists that describes how graded operations will be conducted between the time that permission is granted to operate the CPL in the facility until operations at the facility are considered routine. The RA will evaluate adequacy of these plans.

Approach

Record Review: Review documentation of test results and resolution of open items for testing of the CPL. Verify the satisfactory integration of these new plant systems with the existing systems. Verify maintenance records and requirements have been updated to reflect the new systems requirements. Determine if the proposed plan will satisfactorily integrate the old with the new facility.

Interviews/Shift Performance: Review the test plan with line management to determine satisfactory understanding and performance, and future planning requirements. Determine the results of corrective actions from the testing.

Training (TR)

OBJECTIVE
TR.1 The training and qualification programs encompass the range of duties and activities required to be performed. **(CORE REQUIREMENT 2)**

Criteria
The tasks required for competent job performance are identified and documented through a systematic analysis of job requirements. Learning objectives are derived from the analysis. (5480.20A, Ch. 1, para7)

Training programs for operations and maintenance personnel include training on the requirements contained in the approved operating basis for the facility. (5480.20A, Ch. I, para 7)

Training programs for operations and maintenance personnel emphasize the importance of compliance with procedures and safety requirements. (5480.20A, Ch. I, para 7)

Approach
Record Review: Review operations and maintenance lesson plans for incorporation of CPL safety requirements. Review the training records and examinations which indicate operations and maintenance support personnel have completed necessary training related to CPL procedures and systems.

Verify that the CPL Hazard Analysis, operating procedures, technical and professional references, and facility/industry operating experience are used to identify CPL specific training content and information for CPL training materials.

Review the degree to which on-the-job training and hands-on evaluations for operations and maintenance personnel are used to reinforce classroom activities.

Interviews: Interview personnel responsible for establishing training needs for operations and maintenance personnel.

Shift Performance: Observe operator and maintenance personnel response to unusual conditions.

OBJECTIVE
TR.2 Modifications to the facility have been reviewed for potential impacts on training and qualification. Procedures have been revised to reflect these modifications and training has been performed to these revised procedures. **(CORE REQUIREMENT 18)**

Criteria
Qualification programs are based on the latest modifications to the facility. (5480.20A, Ch. I, para 7)

Training has been completed and documented for the latest revisions of procedures performed by CPL operators, maintenance personnel, facility operators or supervisors. (5480.20A, Ch. I, para 7)

Approach

Record Review: Review the process used to evaluate changes to operations and maintenance personnel training needs. Review lessons plans, and supporting examinations. Determine if lesson plans accurately reflect recent facility and/or procedure changes.

Interviews: Interview training personnel to determine their involvement with procedure changes affecting lesson plans.

Shift Performance: Observe operations and maintenance personnel in the performance of revised procedures to determine the effectiveness of the training.

CRAD REFERENCES

DOE-STD-1027-92	Guidance on Preliminary Hazard Classification and Accident Analysis Techniques for Compliance with DOE Order 5480.23, Safety Analysis Reports
DOE-STD-1073-93	Guide for Operational Configuration Management Program
DOE O 420.1	Facility Safety
DOE O 425.1A	Startup and Restart of Nuclear Facilities
DOE Order 4330.4B	Maintenance Management Program
DOE Order 5480.19	Conduct of Operations Requirements for DOE Facilities
DOE Order 5480.20A	Personnel Selection, Qualification, Training, and Staffing Requirements at DOE Reactor and Non-Reactor Nuclear Facilities
DOE Order 5480.21	Unreviewed Safety Questions
DOE Order 5480.22	Technical Safety Requirements
DOE Order 5480.23	Nuclear Safety Requirements
10 CFR 830.120	Final Rule, Quality Assurance

APPENDIX III

FINDING CLASSIFICATION CRITERIA
CLASSIFICATION OF FINDINGS CRITERIA

The RA team will use this checklist if an issue must be corrected prior to startup.

A. Initial Screening
1. Does this issue involve a safety system?

2. Does this issue involve processes, functions or components identified in the Technical Safety Requirements (TSR) or TSR implementing procedures?

3. Does this issue involve potential adverse environmental impact exceeding regulatory or site specific release limits?

4. Does this issue impact non-safety processes, functions or components which could adversely impact safety related processes, functions or components?

5. Is this issue non-compliant with WSRC or DOE-SR approved startup documents?

6. Does this issue indicate a lack of adequate procedures or administrative systems?

7. Does this issue indicate operational or administrative non-compliance with procedures or policy?

8. Has this issue occurred with a frequency that indicates past corrective actions have been lacking or ineffective?

9. Does this issue require operator training not specified in existing facility training requirements?

10. Does the issue involve a previously unknown risk to worker or public safety and health or a previously unknown threat of environmental insult or release?

If the response to any of the above is yes, further evaluation in accordance with the issue impact criteria below is required.

B. Issue Impact
1. Does the loss of operability of the item prevent safe shutdown, or cause the loss of essential monitoring?

2. Does the loss of operability of the item require operator action in less than ten (10) minutes to prevent or mitigate the consequences of events described in the Safety Analysis?

3. Does the loss of operability of the item cause operation outside the TSRs or Safety Analysis?

4. Does the loss of operability of the item result in a reduction of the margin of safety as described in the Safety Analysis?

5. Does the issue indicate a lack of control which can have a near term impact on the operability or functionality of safety related systems?

6. Does the issue involve a violation or potential violation of worker safety or environmental protection regulatory requirements which poses a significant danger to workers, the public, or of environmental insult or release?

If the response to any of the above questions is yes, the item should be considered a pre-startup item.

APPENDIX IV

SAMPLE RA FORMS
RA ASSESSMENT FORM 1
Functional Area

FUNCTIONAL AREA:	OBJECTIVE , REV. DATE:	CRITERIA MET	
		YES	NO

OBJECTIVE:

Criteria

Approach

Record Review:
o

Interviews Conducted:
o

Shift Performance Evolution:
o

Discussion of Results:

Record Review:

Interviews:

Shift Performance:

Conclusion:

Issue(s):

Inspector: _____	Team Leader: _____

RA DEFICIENCY FORM 2
Functional Area

Functional Area:	Objective No.:	Finding Observ.	Pre-start Post Start	Issue No.: Rev. No.: Date:

ISSUE:

REQUIREMENT:

REFERENCE(S):

DISCUSSION:

CONCLUSION: (Justification for pre-/post-start decision)

Inspector: _____	Team Leader: _____

Attachment 4

Final Report Information and Format

These reports are only required for ORRs and Levels 1 and 2 RAs. See Attachment 5 for the report format for Levels 3, 4 and 5 RAs.

Contained in this attachment are two RA final reports. These are samples of reports that have been submitted at LANL.

The first report is for the Contractor RA (we now call these LRAs) for the Radioactive Liquid Waste Treatment Facility TA-50. This report is contained in section 2 of this file. The Attachments to the report are not included, but a cover page is included for sample purposes. Information concerning these Attachments is covered in the text of the RR Guidance.

The second report is for the LRA for the Godiva IV Prompt Critical Assembly Machine at TA-18. This report is contained in section 3 of this file. Again, the Appendices for this report are not included, but cover pages are provided.

CONTRACTOR READINESS ASSESSMENT

Radioactive Liquid Waste Treatment Facility
TA-50
Liquid Low Level Waste Treatment
Membrane Filtration Process

Final Report
February 1999

Los Alamos National Laboratory
Los Alamos, New Mexico

Signature Page

I, by signature here, acknowledge that I concur with the team leader in the findings and conclusions of this report in my assigned functional area

_____

Frederic Thompson, Configuration Management

_____

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Executive Summary

This report documents the results of the Readiness Assessment (RA) performed for the low level liquid waste treatment process, membrane filtration system. This new process was installed at the Radioactive Liquid Waste Treatment Facility (RLWTF), building TA-50-1 per Laboratory projects PI 14128, RLWTF Treatment Tanks, and PI 17359, Process Equipment Upgrades for the RLWTF. In accordance with the RA Plan of Action and the Implementation Plan (see Appendices A and B), the scope of the RA is as follows:

- Availability of adequate system design information and documentation in order to safely operate and maintain the newly installed treatment and storage systems.
- Review of construction inspection records and post construction performance and acceptance testing procedures and documentation to ensure that construction and installation of the equipment has been accomplished in accordance with project design drawings and specifications. Also ensure that the equipment has been safely and appropriately integrated with existing facility process and utility systems.
- Availability and adequacy of written procedures for the operation and maintenance of the new systems.
- Review of training records and documentation to ensure that all personnel who have been identified to operate and maintain the new process and systems are appropriately qualified to operate the equipment, and that they have received appropriate, equipment specific training.
- Evaluate the existing administrative controls to ensure that the total quantity of radionuclides contained within Building 50-1 is maintained below Category 2 inventory threshold limits.
- Evaluate the twenty core requirements defined by DOE Order 425.1 and modified by the RA Plan of Action.

Acid and caustic waste storage and processing as well as decontamination operations are not within the scope of this RA with the exception that these operations be reviewed to ensure adequate controls are in place to prevent exceeding Hazard Category 3 radionuclide inventory threshold limits (and entering Category 2 criteria).

The approved authorization basis for the membrane filtration process is the 1995 facility Safety Analysis Report, LW-CST-13-AP13-R0, and supplemental memorandum from DOE-LAAO to EM-DO, "Change to Nuclear Hazard Classification of the RLWTF, TA-50-1, 2, 66, 90 and Plan Forward on Restart," dated 12/17/98.

As summarized in the findings listed below and detailed in Section 2 of this report, several significant issues were found in the functional areas of Configuration Management, Maintenance, Operations, and Training & Qualification. Analysis of these issues reveals that for the majority of the findings, their origins can be traced to one or more of the following three areas:

- **Adequacy and Control of Authorization Basis.** The approved Safety Analysis Report (SAR), LW-CST-13-AP13-R0, dated 1995, is technically weak and often times over-prescriptive with numerous assumptions and "commitments". Several examples were found where the facility was inconsistent with SAR conditions. Some of these inconsistencies were existing at the time the SAR was approved, while several others where created by later unreviewed facility changes (facility USQ/Ds were either not performed or did not properly identify SAR issues). While some of these changes appear technically sound and appropriate, others potentially violate basic SAR assumptions, e.g., design compliance with DOE Order 6430.1A, General Design Criteria. Repeated and common elements of the findings noted in Configuration Management, Maintenance, and Operations are a direct result of SAR noncompliance in these functional areas. The facility's ability to ensure authorization basis

compliance is complicated by their confusion concerning the status and application of governing documents (i.e., the 1995 SAR versus the updated 1998 draft SAR submitted to DOE for review versus the supplemental memorandum from DOE-LAAO to EM-DO dated 12/17/98).
Reference Findings: CM.1-1, CM.3-2, MT.1-1, OP.5-1

- **Facility Formality of Operations.** In 1995 the facility was classified as a Hazard Category 3 nuclear facility and provided with an approved SAR. As illustrated by the results of this RA, the transition over the last 4 years to a level of operations formality (in thought as well as in practice) that is commensurate with a nuclear facility is not yet complete. Continued facility management efforts are required for the consistent development/upgrade and implementation of programs related to configuration management, engineering, emergency planning, maintenance operations, and training & qualification. The facility must continue in its drive for formality of operations that are consistent with a Category 3 nuclear facility. Said differently, they must "say what they do and do what they say."
  Reference Findings: CM.1-2, CM.1-3, CM.2-1, CM.3-5, EP.1-1, MT.2-1, MT.2-2, MT.3-2, OP.1-1, OP.1-2, OP.4-1, OP.5-1, TQ.1-2
- **Institutional Support and Infrastructure.** Several issues related to engineering, maintenance, and training & qualification directly result from known institutional weaknesses across the Laboratory complex. For example, the design process for WM-248 and associated equipment contained less than desirable technical quality, little to no initial design criteria, a breakdown of the design verification process, and completely inadequate post-modification testing. Also, the determination, documentation, and implementation of appropriate maintenance activities by JCNNM was found to be inadequate for the facility safety systems. Without better support from the institution in these and other known areas, TA-50 and other facilities will continue to repeatedly experience the problems noted in this RA. They will have no choice but to replace institutional programs with there own or employ "shadow" programs, either of which result in greater costs and reduced technical competencies.
  Reference Findings: CM.1-2, CM.3-1, CM.3-2, CM.3-3, CM.3-4, MT.1-1, MT.3-1

The following findings were identified during the RA:

Pre-Start Findings:

CM.1-1: The USQ/D program does not provide adequate assurance to ensure that the facility will continue to be modified, operated, and maintained within its approved authorization basis.

CM.2-1: Administrative controls of the facility radionuclide inventory are not being effectively implemented in that the operations personnel are not routinely aware of the current status of this parameter and no actions have been prescribed should this limit be reached.

CM.3-1: Design verification comments are inconsistently identified, performed, processed, and tracked to resolution. There is no confidence that safety and safety-related processes and systems satisfy all functional, design, and authorization-basis requirements.

CM.3-2: Post-modification functional acceptance testing does not adequately confirm function and operability of new and modified equipment in accordance with applicable design requirements.

CM.3-3: A Life-Safety survey is warranted for the modified buildings, systems, and processes.

CM.3-4: Installation of system and process equipment as designed is incomplete.

CM.3-5: The RLW Membrane System Start-Up Management Plan does not include all appropriate contingency plans and start-up requirements.

MT.2-2: The existing maintenance procedures for the membrane filtration equipment and components are less than adequate.

MT.3-1: Essential qualifications for several of the facility-designated maintenance personnel have expired, resulting in an inability to perform designated maintenance evolutions, if such a need arises.

OP.1-1: There is no program or other guidance on the use and control of operator aids.
OP.5-1: Operating procedure DOP-50RLWTF-18, Membrane System Operation, is incomplete and contains errors. The procedure can not be followed as written.
TQ.1-2: Prerequisite qualifications do not cover the range of required activities.

Post Start Findings:
CM.1-2: The facility design drawings do not accurately reflect field conditions.
CM.1-3: The G2 system for control and monitoring of facility equipment has a less than adequate change control process and uses inconsistent equipment nomenclature.
EP.1-1: An emergency drill program for casualty events directly related to the membrane processes, including program records, has not been established and implemented.
MT.1-1: The preventive maintenance program for safety-related systems and equipment is not adequate to ensure their long term reliability and operability.
MT.2-1: The maintenance program for the membrane filtration system and associated subsystems is less than adequate.
OP.1-2: The guidance for equipment and piping labeling is not adequate.
TQ.1-1: There is no OJT training in place to cover tubular ultra filter sponge operations.

Observations:
MT.3-2: The knowledge level of individuals associated with maintenance is weak in the areas of work control and lock-out/tag-out (LOTO).
OP.4-1: A routine operations drill program for normal and abnormal events directly related to the membrane process, including program records, has not been established and implemented.
TQ.1-3: The training program is incomplete in that it lacks discussion on topics such as system overview and theory of operation, integration with other facility systems, and relation to the facility safety basis and mission.

Introduction

Background

Aqueous, low-level radioactive and chemical liquid waste generated by various nuclear chemical laboratories and processing facilities at LANL are currently collected by an existing underground, gravity flow collection system. This collection system terminates at the existing RLWTF, building TA-50-1. The RLWTF is a Hazard Category 3 nuclear facility operated by the University of California under contract to the DOE. The RLWTF uses UC employees to manage and run the facility. The Laboratory's support services contractor provides additional maintenance and construction support on an as-needed basis.
New treatment processes are required for the effluent from the RLWTF to meet derived concentration guides (DCGs) established in Department of Energy (DOE) Order 5400.5, Radiation Protection of the Public and the Environment. A two-phase plan will be implemented to treat the RLWTF effluent. In Phase I, the average annual effluent concentrations will be brought within the DCGs; in Phase II, effluent concentrations will also meet the nitrate discharge limit.
Phase I entails the installation of new process equipment and associated piping, including: a tubular ultra filter (TUF), a centrifugal ultra filter (CUF) for removal of suspended solids, and a reverse osmosis treatment unit for the removal of dissolved solids. The waste to be treated by the new process equipment is collected by the existing radioactive liquid waste collection system. This waste is primarily held for treatment in WM-2, a 75,000-gallon tank. The waste activity levels, and other chemical and hazardous constituents are controlled via existing RLWTF waste acceptance criteria. Four 20,000-gallon radioactive waste influent tanks and two 10,000 gallon and one 4,100 gallon "day tanks" were installed to support the

ultra filtration equipment. It is estimated that when operational, the 4,100-gallon tank, which holds concentrated reject from the centrifugal ultra filter could contain up to 1.7 curies of activity. The secondary waste stream create by operation of the newly installed treatment equipment will be a sludge which may contain up to 30% solids by weight (a consistency of tooth paste). The remainder of the sludge will be water. Concentration of the sludge will be controlled by the RLWTF operations personnel, and while the system is capable of concentrating the waste sludge such that it would be over the transuranic (TRU) waste limits for activity (>100nCi/gm), the current plan of operations is to control concentration of waste sludge such that it will be below the TRU limit and may be disposed of as a low level waste as done with the sludge generated by the existing treatment system.
The phase I modifications were designed and installed under the following two separate LANL projects within TA-50-1:
LANL Project PI 14128, *RLWTF Treatment Tanks*

- Construction of building WM-248
- Installation of four 20,000 gallon raw influent holding tanks in WM-248
- Installation of mimic boards in the control room
- Connection of process instrumentation and controls with the G2 system
- Installation of motor control center MCC-1 and associated cabling and raceway
- Installation of associated piping, pumps, valves, controls, and support equipment

LANL Project PI 17359, *Process Equipment Upgrades for the RLWTF*

- Installation of new process equipment and associated piping, including: a tubular ultra filter (TUF) and a centrifugal ultra filter (CUF) for removal of suspended solids, and a reverse osmosis treatment unit for the removal of dissolved solids
- Two 10,000 gallon influent storage tanks
- One 4,100 gallon concentrate storage tank
- Connection of process instrumentation and controls with the G2 system
- Installation of associated piping, pumps, valves, controls, cleaning and support equipment
- Installation of motor control center MCC-D and associated cabling and raceway
- Modification of fire suppression piping, detection, and alarms
- Installation of HV-012 ventilation unit and associated ducting and dampers
- Removal and redesign of building 50-1 roof
- Removal of natural gas boiler in building 50-1

The purpose of this Readiness Assessment (RA) is to determine readiness of the phase I process and system modifications to safely start up and operate. The RA was performed in accordance with DOE Order 425.1, Startup and Restart of Nuclear Facilities; AL 425.1, Startup and Restart of AL Activities; and DOE-STD-3006, Planning and Conduct of Operational Readiness Reviews (ORR), using the graded approach as defined in the RA Implementation Plan (see Appendices A and B).

Report Format

This final report is consistent with DOE-STD-3006-95 and contains the following:

- Executive Summary
- Section 1.0 Introduction
- Section 2.0 Readiness Assessment (summary of the RA results, by functional area)
- Section 3.0 Lessons Learned
- Section 4.0 Appendices
  - Appendix A: RA Plan of Action
  - Appendix B: RA Implementation Plan
  - Appendix C: RA Team Resumes
  - Appendix D: Assessment Forms (Form 1)
  - Appendix E: Deficiency Forms (Form 2)

Acronyms

CUF	centrifugal ultra filter
DCG	Derived Concentration Guides
DOE	Department of Energy
FMS	Facility Management System
G2	Gensym 2 computer system
JCNNM	Johnson Controls of Northern New Mexico
LANL	Los Alamos National Laboratory
LOTO	lock-out / tag-out
LIR	Laboratory Implementation Requirement
LLLWT	low level liquid waste treatment
LPR	Laboratory Performance Requirement
MEL	Master Equipment List
OJT	On the job training
ORR	Operational Readiness Review
MCC	motor control center
RA	Readiness Assessment
RLWTF	Radioactive Liquid Waste Treatment Facility
RLW	radioactive liquid waste
USQ/D	unreviewed safety question / determination
SAR	Safety Analysis Report
TRU	Transuranic
TUF	tubular ultra filter

Readiness Assessment

A summary of each functional area included in the review is provided below along with a list of the findings and observations for each. The completed Assessment Forms (Form 1) and Deficiency Forms (Form 2) for each functional area are included in Appendices D and E of this report.

Configuration Management (CM)

The objective of this review is as follows: 1) determine if safety-related design, modifications, procedures and documentation are consistent with supporting USQ/Ds, facility hazards analysis documentation, and field conditions; 2) sufficient controls are in place to ensure that the total quantity of radionuclides contained within Building 50-1 is maintained below Category 2 inventory threshold limits; and 3) start-up testing and necessary management controls assure all safety-related systems are currently operational and in a satisfactory condition.

The USQ/D process was found to be less than adequate for the reasons noted below. As a result, there is little documented assurance that facility modifications PI 14128 and 17359 have been designed and installed within the safety envelope established by the approved facility authorization basis.

- Several deficiencies were noted in the USQ/D procedure
- Several procedures were identified that had been developed or revised without performance of a USQ/D
- Only one USQ/D has been developed over the past year for all design-related work
- Activities and conditions were identified in the facility that were different from that stated in the SAR
- A potential unreviewed safety question was identified concerning the modified ventilation system. Specifically, the as-found condition of the ventilation equipment is not addressed in the SAR or TA-50-USQD-FY97-01 and results in an unanalyzed condition. PI 17359 installed a new process air intake to room 70/71. This design is contrary to section 6.2 of the SAR, which assumes that there is not a supply fan to rooms 70/71 (only infiltrated air).

Appropriate design drawings (i.e., piping & instrumentation diagrams and electrical one-lines) exist for the modified process and systems. Subsequent walk-downs reveal that the drawings have not been routinely updated to reflect as-found conditions. Drawing discrepancies include missing piping and equipment, mislabeled or unlabeled equipment, incorrect equipment symbols, and incorrect depiction of flow piping and connections.

G2 system software changes are adequately processed via G2 Change Request Forms. However, a change control process has not been established to routinely update the G2 software to reflect design and field changes. Also, the equipment nomenclature employed in G2 is completely different than that used in design drawings, procedures, and field equipment tags.

Administrative controls have been established for the control of the radiological inventory below the Hazard Category 2 limits. However, operators lack an appropriate level of awareness concerning the understanding and interpretation of values available from the G-2 computer status screen. Also, further guidance in the procedure for necessary actions when the limit is approached is warranted.

Design verifications have not been consistently performed for design modifications. When reviews have been performed, design reviewer comments have not been addressed and/or tracked through closure. As a result, there is little documented evidence that safety and safety-related processes and systems satisfy all functional, design, and authorization basis requirements.

Ventilation fan HV-012 does not incorporate design features to minimize the spread of contamination or prevent outflow to the environment via the process air intake. As a result, the system does not appear to meet the intent of DOE Order 6430.1A as specified in the SAR.

No post-modification testing has been performed for various functional parameters of systems modified by PI 14128 and PI 17359. Lack of sufficient start-up testing has allowed several design and material condition related issues to go undiscovered. As a result, there is no documented evidence that safety-related systems are fully operational and in a satisfactory condition.
A life-safety survey has not been performed for building WM-248 and the modified process areas. Based on the extent of the changes and several noted field concerns, a life-safety survey is warranted.
Several incomplete construction items were identified during the RA (e.g., missing valve, unattached pipe supports, and uninstalled SCAM alarms). Close-out of remaining construction items with subsequent acceptance inspection is necessary to ensure that modified systems have been thoroughly and completely installed and are ready to support facility operation.
Considering the importance of the RLW process to the Laboratory, the RLW Membrane Start-Up Management Plan is less than adequate in several areas, including: consideration of enhanced effluent sampling, performance of HP operations review, functional testing, and contingencies for start-up of the new operation and maintenance of the old treatment capability.
Upon completion of the following pre-start findings, the Configuration Management functional area will support operation of the membrane filtration system.

Findings

Pre-Start
CM.1-1: The USQ/D program does not provide adequate assurance to ensure that the facility will continue to be modified, operated, and maintained within its approved authorization basis.
CM.2-1: Administrative controls of the facility radionuclide inventory are not being effectively implemented in that the operations personnel are not routinely aware of the current status of this parameter and no actions have been prescribed should this limit be reached.
CM.3-1: Design verification comments are inconsistently identified, performed, processed, and tracked to resolution. There is no confidence that safety and safety-related processes and systems satisfy all functional, design, and authorization-basis requirements.
CM.3-2: Post-modification functional acceptance testing does not adequately confirm function and operability of new and modified equipment in accordance with applicable design requirements.
CM.3-3: A Life-Safety survey is warranted for the modified buildings, systems, and processes.
CM.3-4: Installation of system and process equipment as designed is incomplete.
CM.3-5: The RLW Membrane System Start-Up Management Plan does not include all appropriate contingency plans and start-up requirements.

Post-Start
CM.1-2: The facility design drawings do not accurately reflect field conditions.
CM.1-3: The G2 system for control and monitoring of facility equipment has a less than adequate change control process and uses inconsistent equipment nomenclature.

Emergency Preparedness (EP)

The objective of the review of this area is to determine that an emergency drill program for casualty events directly related to the membrane filtration process, including program records, has been established and implemented.
An emergency drill program for casualty events directly related to the membrane processes, including program records, has not been established and implemented.
TA-50 emergency response guidance for spills of radioactive liquids is provided in the TA-50 Site Emergency Plan and the TA-50 Storm Water Pollution Prevention Plan (SWPPP). The SWPPP also

provides guidance on training requirements for spill response and cleanup. Review of these documents indicates that there is no stated requirement to conduct emergency drills to evaluate response to radioactive liquid spills from the new LLLWT process or from the current process contrary to the requirements of LIR 403 and the LANL Emergency Plan.
Observed operator response to a casualty involving a spill of radioactive liquid was adequate and consistent with the guidance of the TA-50 Site Emergency Plan.
Based on the response of the two qualified operators and Health Physics support personnel to the simulated system casualty that resulted in a spill of radioactive liquid, the lack of an emergency drill program is a post-start finding.

Findings

Pre-Start
None.

Post-Start
EP1-1: An emergency drill program for casualty events directly related to the membrane processes, including program records, has not been established and implemented.

Engineering Support (ES)

The objective of this review is to determine if the level of knowledge of engineering support personnel is adequate. Reviews of resumes and interviews of selected personnel indicated that engineering support possess adequate credentials and knowledge of design criteria, facility systems, and components to support the RLWTF.
There were no findings or observations for this functional area.

Maintenance (MT)

The objective of this review is as follows: 1) determine the adequacy of the program to confirm and periodically reconfirm condition and operability of safety-related systems; 2) determine the adequacy of process and associated utility system-related maintenance procedures; and 3) determine whether or not the knowledge level of maintenance personnel is adequate.
Though a preventive maintenance program exists for safety-related equipment, it is incomplete. Most of the existing program is based on existing procedures within the JCNNM FMS system, which is not all-inclusive. The program assumes that JCNNM is knowledgeable enough to schedule and perform all necessary maintenance requirements, with no interface from the facility. New requirements as imposed by the LANL Operations and Maintenance manual have not been implemented, and will require actions by the facility to ensure adequate implementation.
The new process is critical to ensuring the Laboratory can meet environmental discharge requirements. Unfortunately, this new process was built with little redundancy, but will be expected to operate at a very high level of availability. This will require a very proactive maintenance program consisting of a mix of predictive, preventive and highly responsive corrective maintenance to ensure success. Unfortunately, the present maintenance program is essentially “run to failure”, with little proactive maintenance taking place. Consequently, several problems were noted in reviewing the adequacy of the maintenance program put in place for this new process. For example, there is no predictive maintenance program, and the planned maintenance program is only that as described in the paragraph above, with the exception of some routine maintenance procedures written for select components in the membrane filtration system.
A significant number of components in the new process are missing from the Master Equipment List (MEL), which is the document from which maintenance programs are implemented and tracked,

including: preventive and predictive maintenance plans and schedules, corrective maintenance material history tracking and spare parts inventory. Equipment left out of the MEL results in it being omitted from the maintenance program.
A review of the procedures that have been written by the facility to cover routine (periodic) maintenance items directly associated with the membrane filtration system were found to have significant errors, which reduce the level of confidence that they can be performed expeditiously and safely.
Finally, a review of the training program revealed that several key members of the maintenance organization were expired in one or more areas of required training. The extent of the lack of qualification leads to the conclusion that the process for determining and tracking required qualifications within the facility is inadequate.
Upon completion of the following pre-start findings, the Maintenance functional area will support operation of the membrane filtration system.

Findings

Pre-Start
MT.2-2: The existing maintenance procedures for the membrane filtration equipment and components are less than adequate.
MT.3-1: Essential qualifications for several of the facility-designated maintenance personnel have expired, resulting in an inability to perform designated maintenance evolutions, if such a need arises.

Post-Start
MT.1-1: The preventive maintenance program for safety-related systems and equipment is not adequate to ensure their long term reliability and operability.
MT.2-1: The maintenance program for the membrane filtration system and associated subsystems is less than adequate.

Observations

MT.3-2: The knowledge level of individuals associated with maintenance is weak in the areas of work control and lock-out/tag-out (LOTO).

Operations (OP)

The objective of the review of this area is to determine the following: the implementation status of LPR 240-01-00, "Define Facility and Tenant Operations Limits and Configuration (Facility Safety Plans)" as it relates to the direct operation of the membrane filtration process is adequate; the level of knowledge of personnel who operate the system is adequate; there are sufficient numbers of qualified personnel to support safe operations of the system; a routine operations drill program for normal and abnormal events directly related to the process has been implemented; and there are adequate and correct procedures and safety limits for operating the process systems and associated utility systems.
The implementation status of LPR 240-01-00 as it relates to the direct operation of the membrane system is not adequate. The philosophies and guidance of DOE Order 5480.19, Conduct of Operations Requirements for DOE Nuclear Facilities, have not been fully incorporated into the Facility Safety Plan and its supporting documents as required by LPR 240-01-00. The major issues that directly relate to the safe operation of the membrane system are control of operator aids and guidance on equipment and piping labeling. There is no guidance on the use and control of operator aids and the guidance for equipment and piping labeling is not adequate.
The level of knowledge of operations personnel is adequate. Interviews and observations of evolution performance confirm that the two qualified operators have in-depth knowledge of the operation of the membrane system and its integration into overall plant operation.

There are sufficient numbers of qualified personnel to support safe operations of the membrane system.
A routine operations drill program for normal and abnormal events directly related to the membrane process has not been established and implemented.
The membrane system operating procedure has several errors and cannot be followed as written.
Upon completion of the following pre-start findings, the Operations functional area will support safe operations of the membrane filtration system.

Findings

Pre-Start

OP.1-1: There is no program or other guidance on the use and control of operator aids.
OP.5-1: Operating procedure DOP-50RLWTF-18, Membrane System Operation, is incomplete and contains errors. The procedure can not be followed as written.

Post-Start

OP1-2: The guidance for equipment and piping labeling is not adequate.

Observations

OP.4-1: A routine operations drill program for normal and abnormal events directly related to the membrane process, including program records, has not been established and implemented.

Training and Qualification (TQ)

The objective of the review of this area is to determine that training and qualification of operations and operations support personnel who are directly responsible for the membrane filtration process is implemented, documented, and covers the range of activities and duties required to be performed. In addition, determine if training has been performed to reflect facility modifications and revised procedures.
Training and qualification processes for specific operation and maintenance of the membrane filtration system have been implemented, documented and cover the range of activities with the exception of TUF sponge operations. Prerequisite qualifications do not cover the range of required activities in all cases.
The training program documentation focuses exclusively on specific task OJT and prerequisite qualifications. The program does not discuss topics such as: formal training in the theory of operation (which the qualified operators have received); systems overview; integration with other facility systems and operations; operator duties and responsibilities; or the relation to the facility safety basis or mission.
The qualification program is based on the latest modifications to the facility. Training waivers have been approved for the personnel currently qualified on the new process. Training is planned for additional operators using the developed program during the start-up process.
Upon completion of the following pre-start finding, the Training and Qualification functional area will support safe operations of the membrane filtration system.

Findings

Pre-Start

TQ.1-2: Prerequisite qualifications do not cover the range of required activities.

Post-Start

TQ.1-1: There is no OJT training in place to cover tubular ultra filter sponge operations.

Observations

TQ.1-3: The training program is incomplete in that it lacks discussion on topics such as system overview and theory of operation, integration with other facility systems, and relation to the facility safety basis and mission.

Lessons Learned

The following lessons were learned that should be considered in the planning and implementation of future Operational Readiness Reviews and Readiness Assessments:

- Unless a safety issue is identified, the facility should minimize the development of design drawings, procedures, memorandums and the implementation of corrective actions in immediate response to issues identified during the RA. Identified issues are often symptoms of larger issues. Immediate response without consideration of all global issues can create more problems that it solves.
- The RA Plan of Action and Implementation Plan specifically call for the RA to address process-specific issues only and exclude general programmatic issues such as work control, configuration management plans, etc. While this is an acceptable method of RA planning for facilities that are already approved for operations, it should only be considered when the parties involved have a high degree of confidence in the existing programs.

Appendices

Appendix A: RA Plan of Action
Appendix B: RA Implementation Plan
Appendix C: RA Team Resumes
Appendix D: Assessment Forms (Form 1)
Appendix E: Deficiency Forms (Form 2)

Appendix A

RA Plan of Action

Appendix B

RA Implementation Plan

Appendix C

RA Team Resumes

Appendix D

Assessment Forms (Form 1)

Appendix E

Deficiency Forms (Form 2)

Final Report of the Readiness Assessment for

Godiva IV Prompt

Critical Assembly Machine

February 25, 1999

Approvals

Evelyn Mullen _____

Ted Wald _____

Assigned team members have reviewed the report and concurred in the contents.

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Executive Summary

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- **A. Godiva IV Readiness Assessment Implementation Plan**
- **B. Godiva IV Readiness Assessment Evaluation Forms**

Executive Summary
Readiness Assessment

Godiva IV Prompt Critical Assembly Machine

A Readiness Assessment of the Godiva IV Prompt Critical Assembly Machine was conducted in accordance with the LAAO approved Plan of Action and the Team Leader Implementation Plan. The RA started on February 8, 1999 with the review of records and concluded on February 18, 1999, after observation of operation of the Godiva IV Assembly.

Hardware and systems to verify operability of hardware were evaluated and determined to be satisfactory for operation of Godiva IV.

Personnel and Organizational Support was evaluated to determine if there were adequate numbers of qualified personnel and that these personnel had the knowledge necessary to operate Godiva. The program to maintain operator proficiency was deficient and one operator had no record of training on the new "Sweep Procedure."

Procedures and programs were reviewed to determine if procedures were adequate, the safety basis documentation was properly implemented, the emergency response planning was sufficient and that the Resumption Approach Plan provided the proper controls to proceed to routine operations. Some of the emergency planning documents need to be updated, but the Godiva specific emergency actions were satisfactory.

Godiva IV is ready to operate once the pre-start findings are corrected. The details to support the completion of the POA and the Implementation plan are contained in the Forms attached to this report as Appendix B.

Following is a list of all pre-start findings: (Post-start findings are listed in the ORR Evaluation section)

Hardware and Systems

Pre-starts: None

Personnel and Organizational Support

Pre-Start Issues:

1. Proficiency of the Godiva operators must be demonstrated in accordance with the LACEF Training Plan. **(Completed February 16, 1999)**
2. Charlene Cappiello is required to receive the new sweep procedures training. **(Completed February 16, 1999)**

Procedures and Programs

Pre-Start Issues:

3. Appendix 2 to NIS18ESH-QAP-90.1, and the Building Run Sheet for BLDG 0116, Kiva 3, should updated as soon as possible. **(Completed February 24, 1999)**
4. Correct radiological postings at Kiva 3. **(Completed February 25, 1999)**

Introduction

The Godiva IV machine is a portable critical assembly machine residing in Kiva 3. The Godiva IV machine was designed for safe prompt critical operations. Godiva IV uses a safety block powered by a hydraulic lift, two control rods operated by synchronous AC motors, and a burst rod operated by air pressure. Vertical displacement of the control rods can be measured and controlled to within 0.00254 cm (1/1000-in.). The maximum speed of the control rods is fixed to the 60 Hz line frequency. The drive gearing limits the reactivity insertion rate to less than the 0.05 $/s required by the TSR with both control rods being inserted. The control system contains interlocks that restrict the order of assembly of the reactivity components. Godiva IV is used to produce prompt bursts of neutrons for calibration of dosimeter and criticality alarm systems and for basic research into the physics of fissile systems.

Godiva IV is controlled by a hardwired relay control system from Kiva 3 control room as described in Chap. 7 of the TA-18 / LACEF SAR (LA-CP-92-235, Rev.4). The machine protect system is also described in Chap. 7 of the SAR. The operator interface to the system is through manual pushbuttons, indicator lights, and mechanical position indicators located on the Kiva 3 control room operating console.

Burst yield is measured from the temperature increase measured by two calibrated thermocouples, and by neutron monitoring of the burst profile. Activation of sulfur pellets can also be used to provide an integral measurement of the total neutron flux.

This is the restart of a process in a facility that stood down to review integrated safety management of the facility. The approved process for resumption of this process/activity was to prepare for and conduct an Independent Verification of readiness in accordance with the TA-18 Resumption Plan. DOE directed that all of the experimental machines should go through a Readiness Assessment in order to baseline operations of these activities while DOE reviewed SAR revisions. There were a number of delays in the operation of this process due in large part to security changes which delayed the resumption of this activity. Management decided to combine the Independent Verifications with the Readiness Assessment as a conservation of effort. The Readiness Assessment required more effort and was more comprehensive than the IV.

The RA Team divided the objectives provided in the Plan-of-Action into appropriate categories to address the core criteria from DOE-STD-3006. The categories were: Hardware, Personnel, and Procedures. Appropriate subcategories were identified in order to assess specific areas under each core requirement. These subcategories define the breadth of the review. Finally, team members developed criteria by which the selected subcategory was judged. The criteria developed for each subcategory define the depth of the review and are referred to as Criteria and Review Approach Documents (CRADs).

The CRADs are based on the specific area of the team member expertise, the combined expertise of the team members, DOE Orders, other requirements, the potential hazards of the operations,

and the recognized needs of the Godiva VI restart. Team members may develop assessment questions during their review. The review approaches include plans for reviewing procedures and programs; auditing records; interviewing personnel; inspecting equipment and facilities; and observing operations.

The team composition is included in the Implementation Plan as Appendix A.

ORR Evaluation

The Readiness Assessment began on February 8, 1999 and completed on February 18, 1999. All of the criteria described in the Plan of Action were completed as described in the Implementation Plan. A complete record of how the criteria were satisfied is included in the Assessment Forms included as Appendix B.

The core requirements selected and approved for this Readiness Assessment were divided into three functional areas as follows: Hardware and Systems, Personnel and Organizational Support, and Procedures and Programs. This evaluation will discuss these three areas and their readiness to support operations of Godiva IV.

Hardware and Systems
Godiva equipment and systems were inspected and drawing were reviewed and matched against the as-built condition. Maintenance performance was evaluated. A comparison with the as-built condition and the description in the SAR was conducted. Surveillance records were reviewed and the performance of the TSR Daily Checklist was observed. The actual operation of Godiva in the non-burst mode was also observed. The hardware and systems are ready to support operations of Godiva IV. The following is a list of post-start findings from this functional area.

Post-start Issues:
1. Review and improve Control Room 3 housekeeping and document requirements.
2. Provide documentation for the fast-pulse and temperature acquisition system.
3. Evaluate relocation of the Radiation Protection Remote Area Monitor in Kiva 3.

Personnel and Organizational Support
The qualification program and records were reviewed to determine the adequacy of the program and the personnel to perform Godiva operations. There were five personnel qualified on Godiva who are certified as Crew Chief and who are also certified as Crew Members. One Crew Chief and one Crew Member are required for routine operation of Godiva. All of these personnel were determined to be properly qualified and their level of knowledge satisfactory to operate Godiva once the pre-start findings are resolved. There are sufficient numbers of operators for Godiva. Records of modifications were reviewed against the training program and minor deficiencies were discovered which will also be corrected on resolution of the pre-start findings – verify against Tim's statement in the CRAD. Personnel and organizational support is adequate to

support the operation of Godiva once the pre-start findings are resolved. The following is a list of pre-start and post-start findings from this functional area.

Pre-Start Issues:
1. Proficiency of the Godiva operators must be demonstrated in accordance with the LACEF Training Plan. (Completed February 16, 1999)
2. Charlene Cappiello is required to receive the new sweep procedures training. (Completed February 16, 1999)

Post-Start Issues:
1. Establish a method to record and track Crew Chief and Crew Member Proficiency.
2. Modify Godiva Maintenance Training Plan to include the requirement for Pressure Safety Orientation.
3. Clarify training requirements for TID training and ensure consistency between the training plan and certification forms.

Procedures and Programs
Maintenance, operating and surveillance procedures were reviewed for adequacy to support Godiva operations. The procedures were found to be satisfactory. The Godiva safety documentation was reviewed including the administrative controls and mitigating measures to support the safety envelope. The documentation was determined to be adequate to protect the worker, public and the environment. The program to maintain control over the design and assure that modifications are properly implemented and documented was satisfactory. The Emergency Program was evaluated and determined to require update of several documents to reflect current personnel assignments.

Procedures and programs are adequate to support operations of Godiva once the pre-start findings have been resolved. The following is a list of pre-start and post-start findings for this functional area.

Pre-Start Issues:

1. Appendix 2 to NIS18ESH-QAP-90.1, and the Building Run Sheet for BLDG 0116, Kiva 3, should updated as soon as possible. (Completed February 24, 1999)
2. Correct radiological postings at Kiva 3.

Post-Start Issues:

1. Add a security force coordination “check box” to the daily operational checklist.
2. Correct discrepancies between the maintenance procedure, checklist, and experiment plan for pneumatic pressures and document the pneumatic pressure SCRAM setpoint.
3. Correct discrepancy between the maintenance procedure, checklist, and experiment plan for hydraulic pressure.

4. The Building Run Sheets for the other buildings at TA-18 should be updated.
5. The Appendices to NIS18ESH-QAP-90.1 should be properly identified.

Appendix A

Godiva IV

Readiness Assessment

Implementation Plan

Appendix B

Godiva IV

Evaluation Forms

Attachment 5

LRA Level 3, 4, or 5 Checklist and Report Format

The following example is from a Level 4 LRA:

Waste Characterization, Reduction, and Repackaging (WCRR)
LRA Level 4 Checklist and Final Report

Team Leader:	Deidra Yearwood	Date:	October 12, 2000
Activity POC:	George Vigil		
Team Members:	Jim Grise		

All team members met the minimum qualification requirements described in paragraph 5.4.2 of DOE-STD-3006-95

Description of activity:
The WCRR Facility is situated on the West Side of TA-50 along Pecos Drive near its intersection with Pajarito Road. The Chemistry Facilities Operations Group (CST-25) and the Environmental Technology Group (E-ET) are responsible for the WCRR Facility Management and programmatic operation, respectively. Other facilities that are near the WCRR facility include the Radioactive Liquid Waste Treatment Facility and the Radioactive Material Research, Operations, and Demonstration Facility (both within TA-50) and the Plutonium Facility across Pecos Drive in TA-55. Closed disposal pit No. 6 borders the WCRR Facility along its southern boundary. The WCRR Facility, Building 69, was constructed in 1979 and modified in 1986. The building is of structural steel-frame with a plastic veneer.

The current WCRR Facility authorization basis (Final ITSRs) establishes Building TA-50-69 as a Hazard Category 3 nuclear facility segment, and the facility foot print outside Building TA-50-69, as a Hazard Category 2 nuclear facility segment. These material-at-risk hazard category limits will be maintained according to the ITSRs by appropriate nuclear material inventory management controls.

The WCRR Facility mission includes several activities in support of transuranic (TRU) waste characterization operations. Inside Building 69, waste characterization functions include volume/size reduction of TRU-contaminated large volume metallic items (e.g., gloveboxes) that are disassembled, cut, and repackaged; waste sort/segregate activities, waste visual examination activities, head space gas sampling activities, and waste repackaging activities. These functions are conducted in glove boxes, under fume hoods, and in the designated open areas in the building. Operations outside Building TA-50-69 include waste container staging, both outdoors and in transportainers, and NDA (PAN and FRAM) operations, conducted in mobile suites or other portable fixtures.

POA Prerequisite discussion:
The following "Conditions" are listed in the POA as prerequisites for the LRA.
A. Meet the SER " conditions of approval",
B. Develop new or revised procedures that implement the requirements in the ITSRs,
C. Conduct and document a Management Self-Assessment by the Facility Manager and the E-ET Operations Group Leader,

D. Document ITSR implementation in the Implementation/Verification Plan,

E. Close out any pre-start MSA findings, and develop a plan to close any post start findings,

The above conditions were confirmed by the MSA and reconfirmed by the LRA. The following comments apply to the "lettered" sections mentioned above:

A. The specific conditions of approval from the SER were:
1. Application of Generic Administrative Control (AC) 4.0.3 does not preclude the occurrence of an ITSR violation.
2. A Fire Protection Engineer (FPE) SHALL review and approve of the design of the barriers listed in AC 4.1.5, Item 6 and AC 4.1.7, Item 3 (to be verified in the RA).
3. The facility procedures shall include verification of the interlocks on the roll-up doors for the vehicle airlock on Building TA-50-69 (to be verified in the RA).
4. Item 3 of AC 4.1.1.3 is not approved in the ITSRs: "A waste container holding more fissile material than specified in Elements 1 and 2 may be allowed onto the WCRRF only after a criticality safety evaluation has been performed and additional controls identified and implemented." A USQ with a criticality evaluation shall instead be submitted to DOE for approval prior to such drums being allowed onto WCRRF.
5. Within one year's time from the issue of this SER, ACs 4.1.1 through 4.1.7 shall be rewritten as LCOs to be included in Chapter 3 of the ITSR.
6. Within one-year's time from the issue of this SER, the PrHA Table of the HA shall be modified to include columns showing consequences and risk after mitigation. The inclusion of this information will improve implementation the facility's USQ program.
7. The requirement to have the drums at WCCRF vented is a safety significant control per this SER and is required for all drums onsite at WCCRF.
8. Regular inspections of drums, using statistical sampling techniques, is required per this SER to verify drum status/potential degradation/other potential issues, including the potential for vent filter plugging (to be verified procedurally in the RA).
9. Section 4.1.1.2 of the ITSR allows a completion time of 30 days to establish a boundary on the east- side of WCRRF where a parking area adjoins facility operations. A fence defines the western and southern boundaries of the WCRRF, and the northeast side is defined by adjacent waste management facilities. DOE finds it unsatisfactory to allow an ill-defined facility boundary to be established after the ITSRs are approved. The RA shall verify that the facility boundary is established prior to release of the authorization basis.
10. The definition for "MAKE SAFE" in Section 3.1 of the ITSR includes the open statement "Other configurations may be considered safe under certain circumstances." The RA shall

verify that procedures are in place allowing for a specific interpretation of this portion of the definition.

11. Section 4.1.4 of the ITSR allows a completion time of 30 days for establishing the boundary for waste container staging locations in the outside operational area. DOE finds it unsatisfactory to allow an ill-defined boundary for the staging locations to be established after the ITSRs are approved. The RA shall verify the established boundary of waste staging locations prior to release of the authorization basis.
12. Surveillance requirement 5.1 of Section 4.1.5 in the ITSRs allows up to 30 days to establish criteria for acceptable levels of combustible material and approved ignition sources for Building TA-50-69 and for outside Waste Container Staging Locations. It also allows up to 30 days for a Fire Protection Engineer (FPE) to approve the same. DOE finds it unsatisfactory to allow definition of these items after the ITSR is approved. The RA shall verify that criteria and levels of combustible material and the approved ignition sources are established and approved by the FPE prior to release of the AB.

Each of the above conditions of approval was listed in the ITSR Implementation/Verification Plan and the Objective Evidence were listed and verified by the Facility Manager. The LRA team also verified that there was evidence that all of these items had been properly considered and understood by the operations personnel. It was determined that CA 3 was not adequate in that the door interlocks were not tested by an approved procedure. There were procedures for performing preventive maintenance on the doors, but testing of the interlocks was not included. **This is listed as Pre-start Finding 1.**

B. The procedures that implement the ITSRs were individually verified and documented in the ITSR Implementation/Verification Plan.

C. The MSA was completed and the report was available for review.

D. The ITSR Implementation/Verification Plan was available and satisfactorily documents the implementation process for the ITSRs.

E. Evidence of closure of the MSA pre-starts and the plans for closure of the Post-starts were available.

Review Approach:

Records Reviewed:

- Objective Evidence Packages for Core Requirements 1, 2, 3, 4, 5, 9, 10, 11, 13, 15 and 18. These packages contained all of the revised procedures; training and qualification records, procedures and documentation; ITSR implementation documentation; surveillance process documentation and surveillance procedures; Emergency Response Plan and drill records; the Startup Plan; organizational structure and roles and responsibilities; staffing; and modifications. **(See Observation 1)**
- ITSRs for WCRR

- SER for WCRR ITSRs
- MSA Report
- WCRR Facility ITSR Implementation/Verification Plan
- WCRR MEL
- Facility Tenant Agreement
- Fire Protection Engineer Evaluation of TA-50-69 WCRR Facility Combustible Loading Requirements

Interviews conducted:

- Facility Manager
- WCRR Project Manager
- Alternate Nuclear Operations Manager
- Operations Leader
- Operators (3)
- RCT
- Training Coordinator

Performance observed:

- Cold PAN operations
- Cold FRAM operations
- Daily ITSR surveillances, RCRA inspections and pre-operations checks
- Table top review of weekly surveillances
- Plan of the Day Meeting
- Pre-operations brief
- Post operations brief

Checklist

The following checklist items from the approved POA were verified	**Completed Yes/No**
6.1 New procedures that implement ITSRs or sections to existing procedures that have changed to implement ITSRs will be verified. There are no safety limits associated with the facility.	Yes

The following checklist items from the approved POA were verified	**Completed Yes/No**
Comments: These procedures have been properly drafted, reviewed and implemented	
6.2 Verification of training for surveillance, conditions/remedial actions and other administrative controls invoked by the ITSRs will be performed. (NOTE: Training and qualification for conduct of already approved TRU waste container handling, visual examination of waste, drum headspace gas sampling, waste size reduction, waste sort and segregate, and waste items size reduction are already established and were not changed or affected by the ITSRs.) NDA (PAN and FRAM only) operations personnel are already qualified to operate NDA (PAN and FRAM only) equipment at the RANT Facility and conduct of operations were not changed or affected by the ITSRs. However, as a new operation in WCRR Facility, NDA (PAN and FRAM only) training for operators will be verified, to include safety controls in the ITSRs. Verification of the facility and operations training and qualification programs will be conducted.	Yes
Comments: Surveillance training has been conducted and documented. The PAN and FRAM operators are qualified for operations at WCRR.	
6.3 The level of knowledge of operations and facility management personnel, with respect to the ITSRs, will be verified through examination of records and interviews of personnel. The level of knowledge for NDA (PAN and FRAM only) operations and associated safety controls invoked by the ITSRs will also be verified.	Yes
Comments: Training records and interviews confirmed an adequate level of knowledge.	
6.4 The facility safety document is the final, DOE approved, ITSRs. Therefore, the document will not be verified by the Level 4 Laboratory Readiness Assessment. Verification of the change control system for design features of systems important to safety will be conducted.	Yes
Comments: The change control process is satisfactorily implemented.	
6.5 Verification will be made of the program to confirm the condition and operability of systems important to safety. No safety systems within the facility have been modified. There are no NDA (PAN and FRAM only) equipment/operations safety systems that have not been previously analyzed and deemed operable and in satisfactory condition under NDA (PAN and FRAM only) operations in the RANT Facility safety analysis.	No
Comments: Confirmation of operability is performed satisfactorily. There are problems with the Appendix B Design Features in the ITSR and some of these do not properly flow into procedures and the MEL. **(See Pre-Start Finding 2)**	
6.9 An emergency response plan which will include emergency response, personnel evacuation, and lessons learned for the outside segment of the	Yes

The following checklist items from the approved POA were verified	**Completed Yes/No**
facility, has been developed and will be verified.	
Comments: Emergency response actions have been verified and drills conducted to improve the process.	
6.10 This CR is not applicable to the Level 4 Laboratory Readiness Assessment except for NDA (PAN and FRAM) operations, which will be verified as a "new start". The facility was not shutdown as part of the ITSRs effort, therefore, restart programs are not required.	Yes
Comments: The PAN and FRAM Startup Plans are satisfactory.	
6.11 The aspects of the relationships between the FM and the operations tenant(s) will be verified for implementation of the applicable provisions of the ITSRs. These relationships include the Facility Tenant Agreement, implementing procedures, and MOUs.	Yes
Comments: The Facility and operations relationships are well documented and understood by the WCRR personnel.	
6.13 Verification of adequate numbers of qualified personnel will be conducted to ensure compliance with ITSR, Section 4.2.2, Management Responsibilities.	Yes
Comments: There are adequate numbers of qualified personnel to conduct operations at WCRR. It appears that the Facility Management staff is spread very thin for the number of nuclear operations they are responsible for.	
6.15 The changes to the facility (e.g., NDA PAN and FRAM operations and installation of physical vehicle entry control barriers) will be verified to be in place and adequately implemented by procedures as specified in the ITSRs. The NDA (PAN and FRAM only) operations will be verified, since these are new operations in the facility. The remainder of the facility systems were not changed or affected by the ITSRs.	Yes
Comments: The physical barriers and controls were in place as specified in the ITSRs. The NDA operations have been documented.	
6.18 The Level 4 Laboratory Readiness Assessment will verify that facility modifications (e.g., PAN and FRAM equipment, vehicle traffic barriers), procedures driven by the ITSRs, and required training, have been performed.	Yes
Comments: Procedures and training have been updated to reflect the changes to the facility.	
SER Requirement. The Readiness Assessment (RA) shall verify implementation of all controls listed in the ITSR document including all responsibilities, programs, and procedures listed in Section 4.2. Particular attention shall be applied to verifying all procedures and other controls associated with NDA activities since this is a new process identified in the HA/ITSR.	No

The following checklist items from the approved POA were verified	**Completed Yes/No**
Comments: 4.2.1 TSRs Program has been implemented. The Facility Manager stated that there are issues with the Air Lock HEPA Filter and the GLOVEBOX HEPA Filter that requires ITSR changes. **(See Pre-start Finding 4.)** 4.2.2 Management responsibilities are well documented and implemented. 4.2.3.1 The Radiation Protection Program is in accordance with Laboratory requirements and is well implemented. 4.2.3.2 The Environmental Surveillance Program is effectively implemented. 4.2.3.4 The Fire Protection Program has been implemented and the Fire Protection Engineer report states that conditions are satisfactory. 4.2.3.5 Nuclear Criticality Safety Program is in accordance with Laboratory requirements. 4.2.3.6 Unreviewed Safety Question Program has been implemented and there are qualified personnel to prepare, review and approve the documents. 4.2.3.7 Conduct of Operations is adequate. The documentation for the program is being revised due to recent changes in the Laboratory requirements. 4.2.3.8 Maintenance Program requires further review because some of the specific equipment listed in this section does not flow down into procedures and the MEL. **(See Pre-start Finding 3)** 4.2.3.9 The Configuration Management Program is Excellent. 4.2.3.10 The Hazardous Materials Management Program requires further review because the LRA was unable to confirm all of the program requirements listed. **(See Post Start Finding 1)** 4.2.3.11 The QA Program is Excellent. 4.2.4 The Procedures Program is well implemented. 4.2.5 The Training and Qualification program is implemented as described in this section. 4.2.6 Reviews are being conducted as described in this section. **(See Observation 2)** 4.2.7 The Occurrence Reporting system is properly implemented. 4.2.8 The Facility And Process Operating Records are being properly maintained.	

Conclusion: The Facility is ready to operate with the exception of the following Pre-start findings and completion of the pre-start issues from the MSA.

Findings:

Pre-start:	1. The verification of the interlocks for the vehicle roll up door are not included in procedures as required by SER Condition of Approval 3.
	2. The Design Features from the ITSRs do not flow into the MEL or procedures.
	3. Some of the equipment listed in the Maintenance Program Section (4.2.3.8) does not flow into procedures and the MEL. Example: GLOVEBOX ENCLOSURE fire suppression system as built is not as designed and is not in the MEL.
	4. The Air Lock filter is described as a HEPA filter in the ITSR and is in fact a Clean Room Filter. The Glovebox HEPA filters can not be tested in place. These ITSR items need to have changes submitted and approved before operations in Building 50-69 are conducted under the ITSRs.

POST-START:	1. The LRA was unable to verify procedures for handling Flammable Gas containers, limits on flammable gas volumes, limits for vehicle flammable limits as described in ITSR Section 4.2.3.10.

OBSERVATION	1. The packages provided with objective evidence for satisfaction of the Core Requirements listed in the POA were excellent and reduced the time required to conduct the LRA.
	2. Discussions indicated that there are a number of reviews that are intended, such as management self assessments of the USQD process, spot checks of daily and weekly ITSRs, table top reviews and upset conditions for operators and managers of the ITSRs, and the MAR inventory control system. This review program should be formal.
	3. The pre-operation and post operation briefing process appears to be very effective and well executed.

Attachment 6

Guidance for MSA process associated with a RR and MSA Checklist and Report Format

A Plan of Action (POA) is required for all readiness reviews and it outlines the basic requirements for demonstration of readiness. Before line management requests that an independent review be conducted, they should be satisfied that the facility meets the requirements of the independent review process. The best way to do this is to insure that all of the people, equipment, and procedures that the independent team will review are verified ready by line management. This process is what is referred to throughout the Guidance as a Management Self-Assessment (MSA). An MSA can be a process spread over the entire period of preparation or completed in one short period, similar to a readiness review. It can be done with a checklist or have a plan similar to an IP. It is part of the readiness process and can be repeated as necessary to assure readiness. It is not expected to be independent. It can be conducted in phases and should start early. The MSA can be a management tool to prepare employees for interviews and drills (evolutions) performed by the LRA Team. An MSA should be formal and include a report.

The MSA should use the POA as the guidance for the conduct of the MSA. If an IP is available during the conduct of the MSA, it should also be used. Line management should review the IP even if the MSA has been completed before the IP is completed. This review may indicate further MSA action before sending the Readiness to Proceed Memo. When the MSA is completed and deficiencies resolved the Readiness to Proceed Memo should be submitted to the Authorization Authority designated for the start of the LORR/LRA.

MSA Checklist and Report Format

The following example format would be satisfactory for most MSAs. If your Division or Group has a process for conduct of an MSA, use that process.

Team Leader: _____ Date: _____

Activity POC: _____

Team Members: _____

Description of activity: (Brief description of the facility or activity being assessed and the reason for the assessment.)

POA Prerequisite discussion: The prerequisites for the RA/ORR listed in the POA have been completed with the following exceptions:

•

Review Approach:

Records Reviewed:

- (List the records reviewed by the MSA team that aided in the conduct of the MSA)

Interviews conducted:

- (List the titles of the personnel interviewed as part of the MSA)

Performance observed:

(List the operations observed by the team as the performance-based part of the MSA)

Checklist

The following checklist items from the approved POA were verified	**Completed Yes/No**
1. (Cover verification of each of the required Core Requirements from the POA as a separate Checklist Item. Break down the program/functional areas from Core Requirement 8 into separate checklist items.)	
Comments: (Comments concerning the success of the line management getting the process ready or lack of progress. Findings should be described in detail in this section.)	
2.	
Comments:	
3.	
Comments:	
4. Etc.	
Comments:	

Conclusion: The Facility/Activity is ready to operate with the exception of the following Pre-start findings.

Findings:

Pre-start:	1. 2.
Post-start	1. 2.
Observations	1. 2.

Attachment 7

White Paper on Core Requirement 12 (Previously CR 10)

This is a broad interpretation to what is meant by Core Requirement 12 in DOE O 425.1B.

Core Require 12 reads as follows:

(12) An adequate startup or restart program has been developed that includes plans for graded operations and testing after startup or resumption to simultaneously confirm operability of equipment, the viability of procedures, and the performance and knowledge of the operators. The plans should indicate validation processes for equipment, procedures, and operators after startup or resumption of operations including any required restrictions and additional oversight. (CR #10)

In the Engineering and Construction world, the ORR team will want to review your test records for system acceptance testing and all of your plans to get the system ready to demonstrate operability. However, this is not what is meant by Core Requirement 12.

Core Requirement 12 is intended to provide a plan for the period after you get permission to Startup/Restart that describes how you are going to transition to routine operations. This plan should describe additional oversight that will be provided by SMEs and managers and any restrictions applied until the process has been demonstrated. It should describe the steps to hook up and test systems that may not have been completely tested due to the possible introduction of SNM. It should describe how you intend assess the adequacy of procedures and personnel that have only had the benefit of training and walkdowns, but not an actual demonstration of operations.

In short, what startup work is yet to be done and how do you intend to make sure the work is done properly and safely?

The ORR/RA team needs to review this plan and agree that you have enough rigor and have considered the necessary actions before they agree that you are ready to start the process.

The DOE-STD-3006-2000, which is approved for use with DOE O 425.1B, provides clarification of some of the Core Requirements, including Core Requirement 12, in Appendix 3.

Readiness Review Improvement Feedback Form

The LRA was conducted for the facility/activity below:	LRA Team Leader:
Activity Point of Contact:	Date the LRA began:

Did the LRA team provide adequate expectations for the assessment?	___Yes	___No
Did the LRA team keep the POC informed of potential issues as they arose?	___Yes	___No
Was the team disruptive to personnel or activities?	___Yes	____No
Was there an informative close-out of the assessment?	___Yes	___No
Did the assessment remain within the scope of the readiness review?	___Yes	___No

Suggestions for improvement: